DOCUMENT RESUME

ED 390 307 HE 028 139

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TITLE I Know My Stuff: Motivating Your Own Learning in College.
PUB DATE [94]
NOTE 170p.
PUB TYPE Guides - Non-Classroom Use (055)

EDRS PRICE MF01/PC07 Plus Postage.
DESCRIPTORS Active Learning; *College Students; *Curiosity; Higher Education; *Learning Motivation; Learning Strategies; *Self Motivation; Student Behavior; Student Development; *Student Motivation; Study Skills; Thinking Skills; Undergraduate Study

ABSTRACT

This book is a guide to helping college students take charge of their learning in their school environment, by capitalizing on their motivation arising from curiosity. It helps students gain independence from the lecture-study-exam system, with a resulting sense of thinking "I know my stuff." The guide argues that many students who do not work to their potential have a low awareness of behaviors that contribute to academic success. Chapter 1 urges students to do one thing at a time and to relax all tensions so their minds can work effectively. Chapter 2 looks at motivation and self-motivation and distinguishes between learning and academic achievement. Chapter 3 describes lack of curiosity and dependency in learning and their causes, such as the need for authority, the need to hold others responsible, the need for assurance, and other factors. Chapter 4 looks at self-reliance in learning based on functioning curiosity. This chapter explores the acceptance of uncertainty and vulnerability and the development of responsible action and self-confidence. Chapter 5 focuses on students' awareness about learning. Chapter 6 gives some practical examples of learning with a functioning curiosity in English, mathematics, problem solving, science, and history. This section also offers suggestions about organizing term papers and classroom notes and writing laboratory reports. (JB)

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ED 390 307

I KNOW MY STUFF
Motivating Your Own Learning in College

W. H. THOMPSON

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INTRODUCTION

This book is written for the capable students who do poorly or less than they're capable of doing in college. There are too many students in college who do not understand about learning and motivations in the school or college environment. Students can do better learning outside the school where their curiosity functions naturally. This book can help these students take charge of their learning inside their school or college environment. It can also be helpful to the successful students who want to improve their learning capability.

This book is also for the adults who desire to return to school and college and need a reintroduction to school work. What they also need is information about how to learn with their own motivation rather than a motivation to achieve grades.

This book is not for students that have learning deficiencies in basic skills. I have met students in college with grade school reading, writing and arithmetic skills. These students can not do simple fractions, have difficulty reading college materials with their fourth grade level vocabularies. After a successful remediation program, in the college learning center, they could be better prepared to use this book.

All names used in the book are first names. All these first names have been change except for a few names I was able to get permission to use.

WHY THIS BOOK

This book is the result of an observational study, I did while teaching and counseling students, over a six to eight year period in a two year technical college. I was responsible for a Pre-engineering technology program, a preparatory program for the college at the college. All the students in the program had high school diplomas. Most were in the preparatory program, due to the mathematics or science deficiency, a small number, who were referred to the program, were freshman in an engineering technology program.

In my first two years with the preparatory program three questions surfaced that needed some answers which eventually became the substance for this work. 1) Why were capable students with good potential failing courses and being academically dismissed from the preparatory program? 2) Why were students who succeeded in the preparatory program, some with honors, being academically dismissed in the first semester of their freshman year? 3) What can be done about it? My first effort was to involve the faculty who taught in the program. This did not work out. When I decided on the study I also understood that I could not involved the student's teachers. Their participation would effect the results and change them. They could not be observers and actors at the same time.

The above formulated questions were not for the students who were academically deficient and needing remediation in basic skills, but for those underachievers whose abilities were intact. Their motivations, however, were inappropriate and misdirected, and some attitudes needed correction. Two underlying problems these student were experience became evident: 1) a low awareness about the kinds of behavior that produces results in acquiring an education in an academic environment, 2) a non-functioning curiosity, i.e., there was no wonderment or curiosity about the subject or the definitions of the terms and words essential to understanding the subject. Much of their learning was rote. Chapter 3 is the result of this study. Chapter 4 The Functioning Curiosity is my answer and remedy to the problems discovered in chapter 3. Chapter 5 is my effort to help students understand and improve their awareness about learning.

The first chapter's purpose is to set the student at ease with some significant and important information that can be readily understood and used immediately. Chapter 2 is important because it defines the significant terms that are used for the rest of the book.

SOME THOUGHTS ON MOTIVATION

Much has been written in the field of education about motivation. Much of the motivation literature is based on animal studies which has given us such terms as stimulus response, operant conditioning, positive and negative reinforcements, extinction and so on. These terms bring to my mind a spectra of choices for the teachers to use to manipulate student motivation. These motivations are used everywhere where there are awards, rewards and punishments. It is called, by some, the carrot and the stick. If the learning environment is not a nurturing for every student he or she may interpret negative reinforcements and extinction as a hostile act. Teachers lose too many students when they insist that the greater power for helping and teaching students is in the tough and negative approaches. For the concerned and nurturing teachers these tools can be helpful to their efforts as a teacher.

When a student reaches college he cannot expect to have talented teachers for all his classes. The college with its large class sizes and time restrictions on lecture limits individual attention and reiterations. Students in college need to take charge of their own learning and motivations. The trouble, for most students, is that no one has taught them how to learn, only to pay attention and to do as they are told. Learning uses one's own curiosity. Nature endowed us with curiosity to do our learning. When one learns within the school with their own curiosity it will effectively stimulate interest. Curiosity, our natural explorative drive, is the need to know and to understand something and to systematize it for communication. This need is motive, which I call a "functioning curiosity. The functioning curiosity is the theme of this book. For the students, who are prone to memorize, regurgitate and emulate what they feel the teacher wants, there is a better motive.

MOTIVATION BY GRADES

Are grades a score in a competitive game?

Are they a scale for measuring learning?

Are grades a true indication of learning?

There is no doubt the grades motivate students. They motivate some to get high grades and some to pass or get by. The grade is the thing to aim for. We all know that the struggle for grades generates worry and anxiety. For some the motives for getting grades are similar to the motives in sports. Sports are games of competition. Grades are competitive. Games are for winning. Grades are won. "Hooray, I got a Beee." Test and examinations are competitive. With this concept the striving for grades as in sports has its casualties. Those that are good at the game like it and succeed those that are not good at it dislike it and drop out. When the measuring system becomes more significant than what is being measured strange things happen.

What should be important about learning is the student's understanding of their courses. Learning without understanding is not real learning. This book is about this alternative. This book gives a new view on motivation for learning. Perhaps the method the student uses for learning needs to be examined. At the present time academic standards are a mixture of fiction and fact.

The most important thing anyone can learn in college is the ability to think. This book is about thinking and learning and thinking while learning. The functioning curiosity is central to the ability to think while learning.

CHAPTER I

THOUGHTS HABITS AND ATTITUDES

Learning in college is an art that has its own skills. This book is about learning the art of learning. There are three aspects, relative to learning, you should think about because they can effect your learning in college. I pose them as questions. First: How do you feel about what you came to college for, e.g., your goals? What are your thoughts, habits and attitudes about learning, studying, homework, reading, writing and figuring? What are your feelings about teachers, professors, classrooms, textbooks and laboratories and so on? Second: What is motivation to learn? How does it relate to your need to achieve and your need to know and to understand something? How are these affected by your need to follow orders and to do as you are told? Are these motivations the same or are they different? Third: Is there such a thing as good learning attitudes and practices? What are they? This book is my effort to give you some effective answers to these questions. First, let us consider the topic of this chapter which is about our first question.

Most students entering college have some preconceived notions and predilections about their abilities for studying and learning. They focus on the anxiety producing game of winning or losing in the lecture-study-exam system of grading. They can have an unrealistic sense about college work loads due to minimal amounts of homework given in many courses in high school. Learning is often viewed by students as a rote process of memorizing formulas, dates, paragraphs and methods of procedures at the expense of understanding. Mnemonic devices for memorizing information are also used to aid memory for getting better grades. Other students worry so much about whether they can remember everything needed for passing exams that they find themselves in a cycle of worry and failure from which they seemingly cannot escape. Under such conditions the students can become fearful and their studies filled with drudgery. Of course, there are those students who are confident from the beginning of college who do enjoy their experience and their success. Some students succeed because they know how to learn and know their stuff or they know how to play the lecture-study-exam system with their classroom authorities.

In what follows I will present some thoughts about student experiences that I have discovered helpful to some unsure or fearful students as they start out on a new learning experience in college. The experiences are not unique, but they are common to many students in the lecture-study-exam mill. These are examples of students who were not properly oriented in their own motivations for learning. In later chapters I hope you will discover that many of these examples are not real problems after all, if the students involved had had a functioning curiosity as described in the next chapter.

ON COURSES ATTITUDE

In my experience many students entering college could increase their chances of success if they wanted to do something about it. The reasons for this inertia against improvement are many, and they do appear to be logical reasons from their point of view. I have heard as a rationale against learning study skills, "If I hadn't learned how to study after twelve years of school I'd be really stupid.", or against a new method of problem solving, "Why do I need to learn that when I can do it my own way?", or against taking a developmental reading test, "I already know how to read!". Each of these remarks may appear to be important to the student who made it and the students who support his view, but it is more important to know why the remarks were made and what kinds of responses were wanted. The usual reasons behind these remarks are not for inquiry but evasion, not learning but laziness and the end result is most often self deception and self defeat.

Jim, while a student in the preparatory program, resented and objected to taking courses in reading improvement and study skills because, he said, "It's a waste of time I could be spending on my other courses." He stayed in the course, but did not bother to learn much that was offered. He did, however obtain a 3.2 grade point average in the program, which indicated a good potential, but he failed out of college at the end of the first semester of his freshman year. I was able to talk to him before he left the college. He explained that because he did so well in his courses in the preparatory program he felt he knew the material in the mathematic and physics courses so he did not need to study those subjects and could spend more time with the course from his major program. This thinking caused Jim to flunk his first tests in mathematics and physics. He then fell behind in these two high credit courses and could not catch up. There is a similarity about his attitude in both programs. Jim made his own decisions about what he considered was or was not important enough for him to study. He did not realize he was not getting adequate feedback about the knowledge he possessed or remembered in his mathematics and physics courses any more than he realized any need for reading improvement and study skills.

Please, do not assume that you know all about study, but objectively look at your study habits and skills and see how you can improve them. This book is primarily about motivation in learning, therefore I will not make any conscious effort to develop study skills. Yet study skills are important to increasing your success in college. I recommend you use some good study skills books and do your own research to improve your own study habits and skills. A list of study skills books appears in the appendix.

WORRY ABOUT PASSING COURSES OR GRADUATING

One of the most common problems facing many freshmen students in the first days of college is worry over passing courses and graduating. Such worry can be destructive to success in college. The roots of such worry lie in the lecture-study-exam system of academic achievement.

As department chairperson of a pre-freshman program in a two year college I interviewed Mike, a candidate for the program. He had not been a good student in high school but he was determined to become a top student in college. He exuded a high level of motivation, confidence and ambition. Despite his poor background it was difficult to refuse him an opportunity. He was accepted into the pre-freshman program.

At the end of the third week of classes in the fall semester

Mike was in my office in extreme agitation and worry. His face was flushed and he looked exhausted. He said, to my surprise, that he was going to flunk out of college and that he seemed helpless to do anything about it. Question: How did this highly motivated student get into such an impasse?

"Mike, tell me what is happening. What's going on?"

"Every evening after dinner I go to my dorm to study. I sit down at my desk and start to work and I feel so exhausted that I can't do anything. The harder I try the more exhausted I feel. After a while I lie down on my bed to get some rest, but I can't rest or sleep thinking about all the work I have on my desk. So I get up and sit at my desk to work and I start feeling exhausted all over again. I keep doing this up and down, desk to bed, until eleven o'clock and then I get into bed and stay there. It is like this every day. I just can't seem to get any studying done, and if I don't I am going to flunk out."

Mike was in a real bind. I had to take some time to find out what was going on. I consulted with a friend on the week end, who was a professional in the field of youth work. I then called Mike into my office and told him I thought I understood his problem and would he want to hear what I might have to say about it. Of course he did.

"OK Mike, what I think you are up to is this; without consciously knowing it you are endeavoring to build a failure free environment. You want to learn all your subjects well enough so you will know ahead of time that you will pass all your tests and exams before you take them. I suspect you want to do this with high scores as well. This endeavor is causing you all sorts of mental fatigue because you cannot remove uncertainly or eliminate failure completely. This I believe, is the cause of your exhaustion. Your task is not whether you can eliminate failure, but rather can you risk failure. Your study should be used to reduce the risk of failure, not to eliminate it. So Mike, I think you need to learn to risk failure if you are to succeed. Can you relate to what I have said?"

I saw Mike visibly relax, he laughed nervously as the tensions released. As he laughed he said, "That's what I've been doing." We talked a bit more and he left. Immediately he started turning his studies around. Mike did become a successful student. Mike's lesson is: first accept failure as one of the outcomes of test taking and assume this risk. Then study can be used to reduce the risk so we can easily cope with taking tests or exams.

Mike "froze" when he was endeavoring to study. Some students wait until they take a test or final examination and then they 'freeze'. Jack had this problem. He was unable to succeed on any test due to an immobilizing worry about failing while taking the test. Could Mike's remedy work for Jack? It is unlikely that Jack and Mike would view their problems in the same way. Jack had to learn that worry was an irrational behavior that would guarantee failure on tests and exams. Why is this? When we use our heads for thinking it is best to think about one thing at a time. Do the test or worry. Do the exam or worry. If you do both you should know that you are headed for disaster. Decide ahead of time what you are going to do; take a test; or have a disaster. It is a rational choice. So stop being an irrational, make the decision, then relax. Let go of Mr. Uptight and do the test. When Jack did this on one test the result was a very happy surprise. He found out how well he could do and how well he could think during a test. Be rational about your college task. Action is a good substitute for worry.

Many students believe college is about passing courses and graduating. The emphasis about acquiring knowledge seems to be of minor importance. Many such students enter college worrying about passing their first semester's courses, and next semester's courses, next year's courses and, "how will I be able to do all those senior courses?" "Gosh," they might think "how will I ever graduate?" It is needless to say that these attitudes are self-defeating. The fact is that a student should not concern himself about graduating or passing courses. Such concern about future happenings has the seeds of worry and anxiety that often end with dropping out of, or being dismissed from college and have been the cause of "mental breakdown."

What can you, as a student, do about it? I would suggest that the only thing any student needs to be concerned about, that relates to his success as a student, is doing Today's Work. That means discovering what each "today's work" is by planning and scheduling your work to include your daily assignments and your semester's term papers and research projects prorated so each day's work limits can be defined and understood by yourself. Then all you need to be concerned with is doing each "today's work" to the best of your ability. Forget your tomorrows. The only thing that counts is today and how well you do your daily work while taking time for proper relaxation.

Joe was a student who got caught up in his worrying about his tomorrows. Joe was a 29 year old student, in his first semester at the college as a freshman, was married, a father and a veteran on the GI bill. He constantly worried about flunking mathematics, physics and other courses. He looked worried; he acted worried; always tense and never relaxed. He talked with everyone about his worries; faculty, administrators, students and secretaries. No one could help him, relieve him or relax him. Tests were being flunked time and time again. He was on the scholastic skids. When warning grades came out at midsemester Joe received a failing warning in all but one course. He was so shattered he made a decision to drop out of college. He needed time to rearrange his affairs while supporting his family, so he decided to stay in school until the end of the semester so he could use the GI bill monies. What happened? Joe immediately started doing well in college. He was passing his tests and he was functioning. Why? My guess is that he had thrown away his future with all its worries about tomorrow. His mind was free and he could think. He could work effectively on "today's work."

This message, of "living today", is not new. It comes down to us from the ages. Most recently it was stated as "live in the here and now" by Frederick Pearls, the father of Gestalt Therapy. By the "now" he meant the present moment; not yesterday or tomorrow. Be concerned with the "now." Doctor William Osler, a Canadian physician who taught at Johns Hopkins University near the turn of this century, prescribed in his essay A Way of Life, that we "live in a day tight compartment." Thomas Carlyle, the nineteenth century Scot writer, put it this way, "It is not our business to divine what lies in the distant future, but to do what readily lies at hand." Marcus Aurelius Atoninus, 121-180 A.D., Roman emperor and stoic of the second century, said it this way:

> Trouble not thyself by pondering life in its entirety. Strive not to comprehend in one view the nature and the number of burdens that will fall to thy share. Rather, as each occasion arises in the present put this question to thyself; "Where is the unbearable and unendurable part of this task?" Confession will put thee to blush! Next recall to mind that neither past nor future can weigh thee down, only the present. And the present will shrink to littleness if thou will but set it apart, assign it its boundaries, then ask thy mind if it cannot bear even this.

And in The Sermon on the Mount Jesus said, "Take no thought for the morrow; for the morrow shall take thought for the things of itself. Sufficient unto the day is the evil thereof."

TO LEARN IS TO CHANGE

It has been said that learning changes the learner. Any student graduating from college is not the same person who entered the college. He or she has changed in many dimensions in the areas of skills, knowledge, intellect, etc. "To learn is to change." and "learning is an acquired change in behavior." are two ways I have expressed this to students. If you want to learn to write, then, learning to write should change your knowledge of writing and change your writing behavior. A course in algebra, if you want to learn, will change forever the way you solve mathematic problems and perceive mathematics with its positive and negative numbers and variables used to express numbers. A significant learning experience can change a person's life completely by bringing great insights that provide a turning point in one's life.

Many people may consider these statements about change obvious. Why bother to mention them? It would seem easy for students to accept change because they are young and therefore flexible. The fact is that rigidity in one's life is not limited to any age group. Many have heard, "It is hard to teach old dogs new tricks", but I can assure you that it is also hard to teach young dogs new tricks. Many students just out of high school have difficulties with change. They will fight against learning a new idea or a new method and are set in their ways of thinking. There are a number of reasons that relate to the fear of change which I will discuss in chapter 3.

If you resist some learning because it requires changes you do not want to make for reasons of ego, pride or stubbornness, you are playing a dangerous game. The missed learning is most surely going to be needed at some future time and most likely in a future course. In college such practices will make learning more difficult and may even be disastrous. To make your learning easier, be open to change.

OWNING YOUR OWN GOALS IS IMPORTANT

Thomas came to see me on Monday morning after midsemester warning grades had been issued. He had returned after a weekend at home. He was upset. It was in 1968 when the age of majority, in our state, was twenty one and grades were sent to the student's parents. Thomas was eighteen, and had received several midsemester warning grades in his first semester of the pre-freshman program. This caused havoc at home throughout the weekend. His parents, he said, would not stop hollering at him. Further discussion with Tom revealed that he was very conscious of a need to please his parents by doing well in college. He also did not like the hostility his poor performance caused, or the constant hassle at home. He felt harassed and he looked harassed.

I asked Tom this question, "Tom, do you want to graduate from college and get an associate in engineering degree?" Yes he did. "Do you want to succeed in your present program?" Yes he did. "If you did what you wanted to do your parents ought to be satisfied. Am I right or wrong?" "You are right, but why do they have to hassle me all the time?"

In this situation Tom is trying to do two things at once; please his parents and succeed in his studies. His parents are either overly protective or they lack faith in their children and worry about their success. I said, "Tom you can't keep doing two things, work and worry, at the same time. Can you own your own goals, work toward them and stop letting your parents take them away from you so that they end up running you and your goals. When you come back to college, after the weekend, can you leave your parents and their worries at home. Don't bring all their worries and concerns about you, and for you, back to college and saddle yourself with worry about their worries. Come back to college to do your own work. Do you think you could do that, Tom?" Tom did have considerably more success in the second half of the semester but it was not sufficient to overcome the disaster of the first half of the semester. He was dismissed by the college.

THE BIG QUESTIONS

Many teachers are asked questions about the validity of their course and course topics. You know these questions. If you haven't asked them you have heard them asked. These questions have irritated many teachers and for good reason. They are very threatening because they attack the teacher and his or her course and they come across as impolite and impertinent and, added to that, there are no ready answers to these question. I call these questions the BIG QUESTIONS. What are these BIG QUESTIONS that teachers are asked, and expected to answer. Here are some of them:

a. What do I have to take this course for?
b. What can anybody learn from a course like this?
c. Why do I have to learn factoring? What good is it?
d. I'm going to be a technician so why do I need to study English anyway?

The reason I consider such questions as these BIG QUESTIONS is that they are central to your life as a student at college.

James asked me one of the questions. He asked me, "What can anybody get out of a course like this one." My reply was, "That is a very good question, James, and you are wise to ask it. You should ask that question about this class and about every class you are enrolled in-- but, you are asking the wrong person." James started asking the right person, himself, the ˜BIG QUESTIONS and his life in college changed. In all his classes he became an excellent student. Yes, it is very important for you to know what you are doing in college and what you should be doing in any course. These BIG QUESTIONS, which baffle many teachers, are your question to yourself. Sometimes you have to take the course to get the answer to some of these BIG QUESTIONS and it is important that you find answers. The teachers can help you along the way but the answers to the BIG QUESTIONS start with you. It is a first step you can take toward becoming a responsible and self-empowered student. This book can help you find some of these answers.

THE LESSONS OF CHAPTER 1

There are three helpful lesson learned by the students in this chapter. First, they learned that to study effectively they had to do one thing at a time. They could not effectively work on their studies when their parents were setting goals for them that caused stress and confuse their ability to set goals for themselves. They could not worry about passing a test while they were trying to take a test. Trying to eliminate failure causes worry and anxiety which prevents and immobilizes learning. Life and learning is a risk taking activity. DO ONE THING AT A TIME and take the risk. The other lesson was to RELAX ALL TENSIONS so your mind can do its thing.

The first is necessary to the second. In this way these students were free to work on their studies. They were all able to do better work. Yet, this is only the beginning to becoming a successful self-reliant and a self-empowered learner. The last lesson of this chapter is take responsibility for getting the BIG QUESTIONS answered. These questions are important to why a student stays in college.

SUMMARY

All the above situations I suspect can be found among the students in almost all educational institutions in the United States. These problems are far from being unique. The pressure to succeed in the locked step of the lecture-study-exam system does cause excessive stress for many people. The solutions to the dilemmas as they appear in this chapter can be summarized simply: do only one thing at a time. Do not confuse what you are doing with any worry or concerns that do not relate directly to what you are doing at the present moment. The counsel presented in this chapter can be helpful to students who are studying under the present methods of instruction.

The art of learning discussed in this book should help you gain independence from the lecture-study-exam system with a resulting sense of knowing "I know my stuff." Examinations and tests should cease to be a worry, not even final examinations should be a problem. The truth of this statement depends on the seriousness of your intent in your learning and applying the ideas in this book.

If you have basic skills problems in reading, writing or arithmetic you will need to remedy these deficiencies if you expect to study in college without stress. If your skills are in order, then learning to learn and to study can solve the problems of stress and worry. The next chapter which deals with motivation in learning should be useful to you in developing an understanding of motivational behavior in the educational setting.

CHAPTER 2

MOTIVATION AND LEARNING

If you want to become a good student without all the headaches and hassle, then it is important, among other things, to understand what motivation is in the area of study and learning. I am going to approach the subject from the standpoint of the student. It is my philosophy that learning is a student's work and he needs to gain the knowledge and the skills to train himself to be a good learner. Stated another way, students need to be empowered as learners. This chapter and future chapters are written to help you to empower yourself as a learner. Motivation for learning is a special kind of motivation and it will be of great help for you as a student to understand it and use it to your advantage. It is unwise to delegate your own motivation to the teachers. In what follows I will define motivation as I believe it should be perceived in learning. This requires that I also talk about ways in which students have historically dealt with their own motivation and achievement. So let us look at motivation.

WHO'S IN CHARGE AROUND HERE ANYWAY?

If you were to ask other students in any two year college, "Who is in charge of your learning?", I can testify that most would answer, "the teacher." I suspect, to varying degrees, this would be the answer in your own college or in any freshmen class in any college. The origin of this answer lies in previous school experiences where pupil obedience was the prime prerequisite for teaching and learning. For example: teachers I have known, who feel that the student's obedience is at the core of effective teaching say, "If the students will only do as I tell them they will get a good education" or "Listen and you will learn." Others who view the school as a training ground for socializing behavior rather than a "hall of learning" tend to be overly preoccupied with school discipline and student behavior. So, again I ask, "Who is in charge of your learning?" Yet, if you consider all their expertise, can you hold the teachers or the professors responsible for your learning?

In regard to the teachers' expertise; we teachers and professors have our limitations in how much we know and can do. I suspect I could apologize to you for not knowing everything there is to know about the subject of this book. I hope you realize I cannot, because it is impossible to know everything about anything. But more importantly, you must realize, I do not know what it is you know and do not understand about the subject of this book. So, I am at a loss to be responsible for what you know or don't understand. Would the situation be any different if you were a student in my classroom? Of course not! I have no way of knowing what you're learning or not learning. Only you can know whether you are learning or not. It is impossible for any teacher to be responsible for anyone's learning other than his own. The fact is YOU CANNOT TRUST ANY TEACHER WITH YOUR OWN LEARNING. The college instructor can determine by tests and examinations that you did not learn something, but this is after the fact and too late. In these respects teaching is a greatly overrated activity. Of course, teaching is not the most important task in the college -- learning is. You are responsible for your own learning and that's a fact! You cannot deny it. You can only accept it or reject it. The consequences of your choice will be your own.

In my view student learning is not the function of a teacher or a professor but is the responsibility of the student. Teaching and lecturing is what the teachers and professors do. Learning is what students do. The task of learning cannot be delegated or avoided. Only you know when you have learned. It is important to become aware of this. You are responsible for what you learn. In later chapters I will talk about improving the act of learning and about "knowing your stuff."

To summarize: If you are to be a great success in college you must take charge of your own learning, it is important to your self-motivation.

BOREDOM: WHO BORES WHOM?

"Gosh, what a boring class!" is heard often on many campuses. True, there are boring professors or instructors, but the complaints far outnumber the actual cases. So what is the problem? The class isn't interesting, you say. Who said it was supposed to be? Perhaps you mistake motivation of the students by teachers with entertainment. Learning is work; student work; isn't it? There are students that are bored while other students taking the same course from the same professor are interested and stimulated. Why is this so?

It surprises many students to learn that the professor's job is not to be interesting or entertaining. His job requires that he bring his interest in his subject to the class. If he does not bring his interest in his subject to his class, his class may be boring or it may be entertaining but it will not be relevant. The basic fact is, that it is impossible for a teacher to be interesting to every student. The best professional entertainers do not succeed in entertaining everybody. It is the student's responsibility to bring an interest in the subject to the classroom. College courses such as physics, mathematics, English, psychology, economics are not designed to be interesting or entertaining-- they are designed for learning. Boredom is most often a symptom of the student's lack of motivation in his learning.

If you feel you are bored in class ask yourself if you are making an excuse for copping-out on your responsibility. Can you do something about your own boredom and motivation? Do you want to? Laying the reasons for your boredom on others may well make you the loser. In the chapter on awareness and the chapters dealing with the functioning curiosity you will discover how you can succeed in creating interest in your own learning.

To summarize: If you are to be a great success in college you must take responsibility for your interest in all your courses as an important part of your self-motivation.

WHAT DOES YOUR CONTRACT SAY?

If you consider what has been said so far, I would have you believe that motivation in learning has very little to do with any teacher, instructor or professor. If we consider learning to be the student's business then, his motivation is also his business. Certainly this should be the case when you are attending college.

Motivation of students among educators, in schools and colleges, is an ever present topic of discussion. The concern about student success in schools and colleges is also a concern about the success of the institution and its faculty. Most educational books address topics that have some bearing on motivation. Any books written to improve the educational process or to criticize it are usually concerned about ideas that will, hopefully, influence and improve student performance. Teachers and professors share this view themselves, so it should be no surprise that they should consider themselves as student motivators. In college the faculty may view themselves less so, but they are still concerned about the student's performance, as the proliferation of Learning Assistance Centers in the institutions of higher learning testify. In my years of teaching I have heard much about the need for teachers to motivate students from the teachers, the school administrators and the students themselves.

So, with all this concern about motivation, the question I pose to college students is, "what can people do to motivate other people?" or, "what can a college teacher do to motivate you?". What goes on between you and your faculty? What is the nature of the unwritten contract you have with them that results in your learning? Does your contract say anything about the faculty doing something about your motivation? Does it say something about the students motivating the faculty? Is it the habit of students to be concerned about their part of the contract other than to do what the teacher tells them? If this is so, it is a minimal commitment that may miss the goal of learning while hitting the mark of mere obedience. This book is about the students part of the teacher-student contract which is necessary for real learning.

To summarize: If you are to be a great success in college you should become aware of your part of a teaching-learning contract that is necessary for perfecting a learning proficiency.

WHAT IS LEARNING ANYWAY?

If we are to discuss motivation in learning we need to develop an understanding about what learning is. What follows is a discussion about learning that can be useful to us in talking about learning in college.

Let us consider two aspects of learning, a) training and b) the acquisition of knowledge. Depending on what we are learning the importance of each will vary. Training is developing and building of skills. It is a process of habituating a skill through practice and rote learning until the skill becomes a part of our spontaneous behavior. It can also be considered a training of our neurology or our neurological behavior. The learning of typing is to a large degree such a training experience. All sports, individual or team, require training for spontaneous reactions, the greater the skill or the faster the sport, such as skiing, the more important is the fine tuning of our spontaneous reactions. Another good example of developing a skill by practicing it until the behavior becomes a part of a person's neurology and is spontaneously performed without mental effort was told to me by Bob, a friend of mine since my high school days. Bob, was a radioman in the United States Navy during World War II. He and his fellow radiomen learned the radio code and typing i.e.,acquired knowledge and training, for the purpose of receiving the dit-da-dit of the coded messages and typing these messages into words. He and his fellow radio men so habituated this process that they would read magazines or books while typing messages they received in code and do it without error. In this example the ear and the hand learned to respond to each other without any conscious thought. The hand reaction to the dit-da-dit of the code heard in the earphones was spontaneous. Developing such spontaneous behavior to whatever degree necessary is a part of learning.

Military training, as an example, requires much learning that is habituated in order to develop a corp of men to react as a unit when commanded. Most college courses require some habituation if they are to be learned successfully. Mathematics requires considerable knowledge acquisition, but it also requires skills building so every step in problem solving does not require working each problem through from scratch. Hence, it is necessary to memorize the multiplication tables so they become a part of our neurological response and recall. In algebra, memory and practice is needed to learn factoring if you are to have any facility in using factoring when it is needed in advanced algebra or in the calculus. Most courses have some necessary training if they are to be successfully mastered, but training must not be substituted for understanding of the subject matter. Many students short circuit knowledge by the misuse of rote learning and the unnecessary memorization of formulas and equations. Yet, if they understood and mastered the knowledge of the science, they would be surprised to find far fewer formulas would need memorization.

The acquisition of knowledge is the more important part of learning in college. Many students evade this learning because they feel inadequate to the task of developing the understanding necessary to acquiring sound knowledge. Instead these students settle for memorizing large quantities of information, data and formulas hoping that this will help them to pass courses. One example I have found is in the study of mathematics and science courses where the students often duplicate on tests the problem solutions, as they remembered them, from the blackboard or the text book. This constant memorization may get some students a passing score, but it will short circuit real learning and deny them their education. Such a lack of confidence is displayed in students who have anxiety about mathematics and science. They also may believe that obedience to, or pleasing, teachers requires regurgitation. I personally know of teachers, with a punitive intent, who require such regurgitation

Shortly after I started the business of helping students with their learning problems I discovered, that to be useful to the students, I had to help them not to be dependent on their teachers. As you may know there are some teachers who are interested in helping students and put a lot of time and effort into helping them understand and do their work. There are other teachers who are hard-nosed and unbending who talk about "maintaining standards" and "getting rid of the deadwood" and have little patience with the fearfully struggling students who do not do well in their classes. The quality, ability and consistency of teaching among teachers is not dependable. Yes, I felt, student's dependency on teachers at the college level had to go! Students needed to learn that a drill sergeant may be alright for the training but not for the learning that requires the acquisition of knowledge. To acquire knowledge required the student's capacity for thinking. Of course, I mean the thinking of the reader also!

This most important part of learning in college is accomplished by inquiry; i.e., questions! I have consistently found that the poor students with good potential often fear to ask questions in class, and other students, because of the attitudes of their past teachers, have felt it a waste of their time. As a consequence, probably most entering freshmen do not use the question in any meaningful way in their learning. Obedience to instruction without any real search for meaning is prevalent. The idea of pursuing knowledge through questioning, I would presume, has not been taught in public education, for all of the students I have worked with in the two year college were not aware of it. I did not learn it in school either.

Important to learning is a person's persistent curiosity. Curiosity requires a question in order to function. It also requires the question be answered. Curiosity also has a persistent desire to understand and to communicate, i.e., to articulate with word, diagram or mathematical symbols. Understanding requires asking your own questions with the onus upon yourself to get answers from any resources that are available and then formulate the answers into your words to insure your ability to articulate an intelligent communication. It is significant to note here that remembering information is much less of a problem when you are using the answers to your own questions with your own logic. It should be obvious that remembering the answers to the teacher's questions or the author's questions, at the end of the chapters, will be short lived in contrast to the results of your own inquiry.

The idea of seeking knowledge through inquiry is not new, it has been the basis of the scientific method since Galileo. "It was Bacon who insisted the nature of science begins when man begins putting nature to the question.... The kind of science which Bacon describes and all modern scientists have practiced is the kind of science in which the first stage is to ask a question and the second stage is to get it answered."[1] Yes, I am inferring that the acquisition of knowledge, as I see it, is similar to that used in science. The main factor about learning in college is you are learning about things that are known and are written in books and understood by the professor, and for this purpose the questions will work well. In pure science, where the scientific endeavor is to discover the unknown, the scientist will use questions, but he will also use theories and hypotheses for making his discoveries in his field of research. If you were to become a scientist you would learn in graduate school how to question, develop a theory and devise a hypothesis. Not much is done in grades one through twelve and the first four years in college to teach children and young people how to do this kind of learning; the concern has persistently been on teaching. In a later chapter I will concentrate fully on how to develop learning through the acquisition of knowledge and training.

MOTIVES AND MOTIVATION

Taking charge of your learning and creating interest in your

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1. Hiz, Henry, editor, Questions, D. Reidel Publishing Co., Boston, 1978, p 327-328

courses and doing the work necessary to master the subject is part of what a person does when he is motivated to learn. Any teacher's hope is that all the students in her classes will be motivated to do their work and learn, but all too often they are not. Hence most teachers take on the task of student motivation. It is central to their thinking regarding student success. The extent to which some of your teachers feel this concern is expressed in one publisher's brochure for a book about teaching techniques, "Chapter ... tells how to use speech, movement and drama in the class room to create suspense and maintain students' involvement. (Author) covers movement, stance, expression, gestures, and use of props to gain students' interest and attention." The book has a lot of substantive material in it, but the publisher's description for this chapter should make college freshmen wonder, if not cringe, about what some teachers think a student's level of responsibility is in the classroom, in terms of both what his expectation of himself must be and his teacher's assessment of him as a wide awake and eager student. Do you think college professors should be involved in the classroom in the manner described? Many two year and four year college faculties do have justifiable concerns for motivation, particularly for the freshmen students.

The problems of student motivation are made complex because of the many factors involving laws about student attendance, school or college rules, parental and teacher expectations, the increasing need and desire for more and higher education in the world of work and, of course, the pressure coming at the teachers from all directions. In the middle of all this is you, the student. If you are a student with a good potential and open to change and challenge, it is possible for you to do something about getting control of your own motivation and learning.

So, let's look at the two crucial words, motive and motivate, and define them so we can use them when we talk about our learning behavior. (a) A motive is some inner drive, impulse or intention, such as a need or a desire, that causes a person to do something or to behave in a certain way. (b) To motivate is to provide with a motive; or effect a motive.

From these dictionary definitions it is evident that it is the motive that has the power to motivate behavior. A motive is a need, desire or a longing that excites us to a behavior or it may result in a group of related behaviors that will bring about motive satisfaction or relief. For example, the need for food and the desire for food are different kinds of motives and the resulting behaviors are different. The former motivates actions to satisfy hunger as hunting, fishing or working for money and shopping and cooking of food. The latter motivates an action that endeavors to satisfy a craving. Usually the behaviors can be complex. A motive may be provided for us by others if we are susceptible or open to them. This can happen to some fortunate student when he studies under an excellent teacher who can so inspire him that a turning point may occur in his life. For example, a student may choose a career in writing because an English teacher inspired him about the power and beauty of the written word. A motive also may be provided by circumstances such as an accident, or a disappointment or falling in love. We can provide our own motives when we decide what it is we want to accomplish or achieve. A motive can be buried in our psyche and unknowingly control our behavior. The work of counselors and psychotherapists is to help people discover such motives. Sometimes our buried motives are responsible for our doing poorly in school work. We will explore this in the next chapter.

Providing, or changing, the motives of other people are not easy tasks, and a discussion of such efforts is not the purpose of this book. What we are going to do is examine many motives, good, bad and buried, which I have discovered by observing students in their own learning process. Many students have found the examination of these motives helpful in identifying their own motivations and in making changes for better motives. It is quite possible that your own examination of these motives may give you some insight into your own motives and motivations for learning. First let us consider what motivation in learning is all about, particularly as it applies to the acquisition of knowledge.

SO, WHAT IS MOTIVATION IN LEARNING?

> "One had to cram all this stuff into one's mind, whether one liked it or not. This coercion had such a deterring effect that, after I had passed the final examination, I found the consideration of any scientific problem distasteful to me for an entire year....It is in fact nothing short of a miracle that the modern methods of instruction have not yet entirely strangled the holy curiosity of inquiry; for this

> delicate little plant, aside from stimulation, stands mainly in the need of freedom; without this it goes to wrack and ruin without fail. It is a grave mistake to think that the enjoyment of seeing and searching can be promoted by means of coercion and a sense of duty." --Albert Einstein

This quotation by Albert Einstein about "the holy curiosity of inquiry" gave me some insights into why capable students do poorly in college. Their natural curiosity did not function when doing school work; for example, I had been helping a number of students who were studying logarithms in their mathematics course. Their questions were almost invariably, "Do you know how to do logarithms?" followed by "Can you show me how to do this problem?" I happened to know that an understanding of the definition of a logarithm was necessary for understanding them. I followed their inquiry with a question. I said "Before we talk about how to do the problem answer this question, 'What is a logarithm?'". Invariably they were ignorant of the existence of any definition. Some of these students were impatient: wanting to know only the individual steps of the solution. Evidently they had little faith in their ability to understand mathematics and required of themselves a great deal of memory work. I can say from the evidence of my observations that understanding greatly facilitates memory. I have checked hundreds of students on this point in mathematics, the sciences, English, and students taking reading and too often the answer is the same, their poor performance is related to a complete lack of understanding or knowledge of relevant definitions. Too many students who lack curiosity about what they are studying do not understand the definitions of technical terms they need to know. Often they do not know the title of the chapter under study or the value or common sense of the steps in a problem solution. In short they have a non-functioning curiosity in the academic environment.

What is needed is for students to discover that their curiosity can function inside the school as well as outside the school. The motive that is needed, in the academic environment, for this functioning, is the need to know and to understand. I shall refer to this motive as a functioning curiosity and to a person possessing this motive as having a functioning curiosity. The person with a functioning curiosity cannot ignore any part of what is to be learned or mastered. This need to know and understand something is the exercise of our natural exploratory drive, which needs our own personal questions of inquiry in order to function. Yet it goes further, Abraham Maslow, an outstanding psychologist, in talking about the "psychology of scientists" puts it this way, "It is man's persistent curiosity that is most responsible for science in its natural-history stage and it is his equally persistent desire to understand, explain and systematize that generates science....."[2] If we look at learning as an exploration it can take on many of the aspects similar to any scientific exploration. As Francis Bacon said the modern method of science requires a question and then its answer. Einstein was considered by many a genius, a man of special creative imagination, and perception that was different. "I have no particular talent, I am merely extremely inquisitive." he replied in later life when asked from whom he had inherited his talents. "So I think we can dispense with this question of heritage."[3] It does appear that both Francis Bacon and Albert Einstein have considered learning as being motivated by an active and functioning curiosity which generates questions about what one needs or desires to know and then proceeds toward the discovery of the answers. True, the scientists were concerned with inquiry into the unknown, but your learning is also an exploration into the unknown - your unknown. You should consider learning as a process of inquiry to acquire and systematize knowledge, new to you, for useful communication. Your knowledge has no value if it cannot be communicated.

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[2] Maslow, A. H., Motivation and Personality, Harper and Rowe, Publishers, New York, 1954, p. 2

Finally, when I am talking about the motive, the need to know and to understand, I am talking about a need that is a must. It is a need that cannot be easily set aside or ignored by a person with a functioning curiosity. In the above example the student studying logarithms in his mathematics course would not be satisfied to ignore the definition and meaning of a logarithm and its applications if he had had a functioning curiosity in college. You cannot become an active learner in any course of study if the only motive you possess is the fear of a low grade in a course or a low grade point average. Such a motive has little to do with the acquisition of knowledge, but in my observation of students, it has more to do with massive endeavors to memorize facts, pages, and step by step problem solutions. Students who have a functioning curiosity have only one measure for their learning and that is themselves. They know what they know and what they understand. In the last analysis they know they have no validator for how well they know and understand but themselves.(chapter 4) Therefore, they have no fears about not knowing they know, and if they have practiced the applications to the point of habituation they will have no fears about passing.(chapter 6) The students in my classes, who have taken the material of this book seriously, can testify to this.

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[3] Clark, Ronald, Einstein, The Life and Times, The World Publishing Company, New York, 1971, p 6

ACHIEVEMENT IN LEARNING

We hear a lot about achievement in educational institutions, and when we are going to school or college we hear a lot more about achievement, so it might be wise for us to develop a definition useful to understanding what we are talking about when we use the word. Also we need to ask, "What are the implications of the word when it is used in school?" The terms academic achievement or scholastic aptitude are applied to achievement tests to show how well some school task is performed. Both are used to describe certain kinds of standardized tests, such as the Stanford Achievement Test or the Scholastic Aptitude Test. The former is to determine the degree of a student's academic achievement in some subject area usually for a diagnostic purpose; the latter uses the student's achievement on a group of tests for the purpose of making predictions of a student's aptitude for achieving at some college. These kinds of tests use special norms or scales as the measure of the student's achievement. Classroom tests, which are prepared and administered by teachers, are also achievement tests, but the means by which they are measured is determined by the teachers for the purpose of grading their students. Hence, we can say that classroom tests and standardized achievement or scholastic aptitude tests are all measures of academic achievement but are used for different purposes.

There are many other achievement tasks that you as students are familiar with, such as writing up laboratory experiment reports, writing term papers, doing special projects and writing essays. What makes these things achievement tasks is that the results are measurable. Teachers assign numerical scores or letter grades to the completed task as a measure of the student's achievement. It is the measurability factor that determines academic achievement. So, for our purposes we shall define achievement in school as follows:

> Achievement in school is a measure used for comparing student performances in doing an academic task. The measure is a numerical or letter grade which shows how the student is ranking or rating within a group of students. It is the determining factor for success and failure.

The multiple choice or objective tests are designed to remove the personal bias of the scorer or grader from the rating system. Standardized tests like the SAT and other published tests are designed to be free of such bias. There are a large number of private businesses that market standardized testing devices. Most all of them sell achievement tests. Some sell college entrance examinations.

Yet, is it right to say that any test used by schools from whatever source is ever free of bias. A most important and significant controversy put forth by the minorities in our country is the unfairness of the cultural bias in achievement testing at all levels of schooling, whatever their source. It may be doubtful that any achievement test can be completely free of the preparer's bias.

Teacher prepared and administered tests and exams, as you should know, are not free of bias. The scoring, for the same task, may vary from teacher to teacher. The personality of the teacher may enter into the grading system. I have never seen a school or college where the grading was uniform among all teachers. Therefore, we can conclude that the teacher's measure of achievement in school will be arbitrary. Nevertheless a fact of academic life is that the achievement in school shall be measured by teachers and professors, and that they shall have full control of determining and assigning such measures for the courses they teach. Grading of their students on tests and other projects is their business. Such is the nature of achievement in schools.

I do believe that the teachers' endeavor is to be honest, and they are not aware or concerned about the variance in grading among them. However, in some situations the students do become frustrated. A number of years ago a student told me an interesting story just before he graduated. It occurred when he was taking freshman English. He and his roommate were taking freshman composition from different teachers. His roommate complained how hard his teacher marked his essays. He admitted to being close to flunking his course. "He bet me that if he turned in an essay I got an "A" on, that his teacher would give it a very low grade." So they did just that. They made a verbatim copy of the "A" essay and handed in to the more demanding professor. It received a "D" grade. After the student had graduated I told the story to an English professor. He was more concerned about the plagiarism of the student than with the conclusions of the student's research into the college's grading policy. Education abounds with stories that illustrate the arbitrary manner of grading and its apparent unfairness. The worst kinds involve favoritism and enmity. When you arrive in the world of work you will discover similar kinds of arbitrary behavior in your superiors and fellow workers. Taken as a whole the profession's competence rates as well as other professions e.g., the medical or legal professions.

You can view your job as making sure that the teachers give you the best score or grade possible, but there is a "Catch 22" if your motive is to get high grades or high scores on tests or exams and not the motive of a functioning curiosity. Many students who do "go for grades" depend on memory alone to get them through the tests and exams. Their concern is not, "What have I learned?", but "What did I get?" No matter how well these students do, in terms of the grade they get, they are not competent learners. Steve was one of my better students in my early years with the preparatory program at the college. At the end of his year in the program Steve had a 4.0 grade point average. Good student, we all agreed. He had taken English, mathematics, physics and drafting and a reading and study course. Three weeks into his freshman year he came to see me. He was afraid he would flunk his freshman physics course. I was much interested in why this 4.0 student would be in such a predicament. As we talked he told me of the difference in the way the two teachers taught their physics courses. In brief, the Prep teacher based his teaching on showing the formulas and their solutions in such a way that Steve did not have to learn physics. Steve memorized formulas and solutions to get his grades. His new teacher's method required that he understand physics. The book did not help since it did not give formulas but developed solutions. Steve did not know how to acquire knowledge. He knew how to follow orders and memorize the steps. It took Steve an extra year to finally complete his degree requirements. It was not easy for him to learn how to learn and to think. Steve did demonstrate that he could do well in school by memorization of the teacher's lecture and through practice. His method of learning did not bring bring about a consistently good performance. He lacked a functioning curiosity.

The need for high grades is not the best motive for college. As you can deduce from the previous chapter, the pursuit of grades can produce a lot of strange behavior and can also cause cheating on tests and plagiarism on written work. There also is the feeling among too many students about "pleasing teachers" or "'psyching' them out" as a means of gaining some control over the teachers' grading policy. Yet, achievement in college is not difficult if you have the right motive and the knowledge and techniques to pursue it.

FREEDOM TO LEARN

In the above section I have endeavored to separate learning from the traditional view of academic achievement because the habits of educators, teachers and administrators do confuse learning with grades under the guise that they are synonymous. This tradition has promulgated for most students the fearful and worrisome grade-oriented aspirations of the lecture-study-exam contest called academic achieving, which makes learning a long series of achievement goals separated by tests and examinations, and most often turns education into a bunch of disassociated and separate tasks that tend to remove the continuity of growth from the process of learning. Many students I have worked with have had difficulty in learning because they lost continuity in their studies. They did not believe it necessary to remember or associate the past completed segments of a course with the segment under study. They actually considered the last segments as "over with" and to be forgotten once the tests or examinations on the segments were finished. This closed compartment view of their study was particularly devastating in courses like mathematics and science in which the knowledge of the course builds upon itself. Also in terms of the idea that each segment of learning had its own academic achievement goal gives some college students a feeling that they are contestants in some sort of a game. I met a young man who, at the time, had just received his doctorate degree. I was curious to know how he felt now that he had completed such a prodigious task. He said, "Oh, it was like jumping over a lot of hurdles in a race." His statement is typical of this goal-oriented model. I find many people who agree with this view that each segment of study is part of a competitive game in which the goal is either an "A" or a passing grade. This competitive race can destroy the enjoyment of learning and enslaves us in a locked-step system of academic achievement.

This subtle pressure for grades, in this locked-step system, does at times transcend the humanity of any teachers who feel called to assist their hapless students in their enslavement by strategizing to help them in the exam crunch. I am sure we all know many teachers past and present, who in a rescue effort, have informed their students, before testing, what kinds of questions or problems would be and wouldn't be on their exams. Sometimes copies of old final examinations may be handed out to help the students. These aids to passing are often given by teachers in response to the questions from the students who fear, not what they have not learned or do not understand, but fear what they may not remember or what they have not memorized. The teachers also do this with the hope of increasing the number of students who will pass their course, which is important to their own viability as teachers. All this enslavement to the cult of grades to obtain an education, which when it is completed and diplomas are received spells the end of education and any real thinking for too many of us. It is different for the students with a functioning curiosity who learn and understand and know their stuff. They find tests and exams a mere routine check on what they already know and understand-- they are never a concern or worry. These two perceptions of learning are separate ideas of study and learning but they are opposite ends of a continuum. At one end there is a rigidity in the student's thinking about the way he views his course. He tends to be limited to the segments of study which his teachers designed to present their course material. At the other end of the continuum the students tend to be freer as learners. Their perceptions of their study and learning is wider than the span of the teaching segments. They tend to view the course as a whole including its purpose and intent. More will be said about this continuum in chapter 4.

Students need not view learning as a bunch of separate goals, but as a constant journey of discovery that increases a growing body of knowledge which they are constantly systematizing for their own personal utilization and communication. There can be excitement in this kind of learning. This I believe was a significant aspect of Einstein's view of learning which involved an active and functioning curiosity. How can you as a student possess this kind of learning ability that involves discovery and excitement? First, it is most important for you to break away from old habits of viewing learning as merely getting grades and doing as you are told. To become a learner you need to be FREE, FREE to think, and FREE to inquire. Albert Einstein put it this way, in the above quotation, "the holy curiosity of inquiry; ----, aside from stimulation stands mainly in the need of freedom; without this it will go to wrack and ruin without fail." If curiosity cannot be forced, and my experience with students agrees with this, then you will need to become free to learn. "Well!!", you say, "How does anyone do that?" It is simple but may appear difficult. It means you will have to be authentic, i.e., be yourself. Remember you are now in college and you have more personal freedom to be who you are -- a free adult. For a college student, freedom to learn becomes an attitude, a state of mind the student takes and owns because he has made a declaration of freedom to be his own student. Your first step of self-empowerment as a learner is a Declaration of Freedom to Learn. The way to facilitate this empowerment is developed further in future chapters.

The freedom to learn is important to your educational goals.

Let us consider the following questions in terms of their effect on your educational outcomes. Did you come to college to do as you're told and get AN education or did you come to college to get YOUR education? What is your education? Did you come to college to prepare yourself to get a good job or did you come to college to prepare YOUR talents and abilities as a preparation for YOUR career? What is your career? Did you come to college to prepare yourself to have a good life or did you come to college to prepare yourself for YOUR good life. How far into the future do you want to plan? The answers to these questions vary considerably with different people. The answers may have a lot to do with the amount of freedom you need for learning. Pleasing instructors or professors to get good grades is politics and may lead more to slavery than freedom in learning, It can entrap your mind to obedience training and will not adequately develop the mind for independent thinking, creativity or for living your own life. Getting an education is a selfish endeavor. It is a selfish endeavor because it is an important time in your life. You cannot give into the unfair demands on your time when you need the time for preparing yourself for the rest of your life. You need to get ready for best possible job that can help you to be a productive and happy member of society, as a spouse, employee, friend and contributor to your society. You should not be getting an education to please your parents, your teachers, or to impress anyone. You need to be free to own and to pursue your own goals if you are to get your own education.

SUMMARY

It is most important that you, as a student, be in charge of your own learning and motivation, particularly since you will be pretty much on your own in college. The most obvious symptom of zero motivation you must be aware of, is boredom with your courses. The professor should not be central to your interest in learning, but the subject material is central. Creating your own interest in the subject material of your courses is vital to self-motivation and effective learning. It is your business to develop such motivation. I will discuss this with you in Chapters 4, 5 and 6.

A good motive for college is a need or desire that causes us to act in such a way that learning results. Such a motive should appeal to a person who wants to learn. This motive is a need to know and understand, in other words a functioning curiosity. If you adopt this motive it will involve a significant change in the way you think and behave toward your study and learning. All learning is an acquired change in behavior, and learning a new motive is also a change. Students who have difficulty with accepting change may find the adoption of a new motive difficult if not impossible. You should, however, find the adoption of this motive most effective in mastering learning.

Striving for academic achievement goals (grades), or a need for academic achievement, is a spurious motive since the scoring system is arbitrary and such dubious tactics as figuring or psyching the teacher enter into the strategy for getting "good" grades. That is the story of the spurious goal of academic achievement. The subject will not be discussed further.

Freedom to learn is important to the student with a functioning curiosity. As a college student your first step of self-empowerment as a learner is to declare yourself free to inquire and free to learn. It is important to learn how to escape the lock-step of the seemingly segmented learning of the lecture-study-examination system which propels us into the pursuit of grades while we lose the real learning experience -- the quest for and the acquisition of knowledge and its utilization. The coming chapters will help you increase your freedom and make your declaration a reality.

In preparation for the next chapter let us look at another factor about motivation in college, and that is the realization that all student behavior is motivated, whether it results in good learning or poor learning. The phrase "the well-motivated student" implies a motivation that results in good grades and a happy teacher. This was the case for Steven in his preparatory year. This was not true in his freshman physics course. Neither he nor his teachers were happy and his grade was in trouble. Nevertheless Steve was still motivated to get good grades as a freshman. The truth is that all student behaviors are motivated. In the next chapter, The Non-functioning Curiosity I will talk to you about some motives, and their resulting behaviors, that can adversely effect good learning.

CHAPTER 3

THE NON-FUNCTIONING CURIOSITY IN LEARNING

Dependency in learning

Self-empowerment as an independent learner is not accomplished by the mere declaration of freedom to learn. There is work to be done to establish yourself as a free learner and to insure this freedom will endure. You'll need to rout out the enemies to your freedom. Who are these enemies? They are the habits, attitudes and motives which foster dependency behavior in learning. The purpose of this chapter is tc aid you in identifying those behaviors, which capable students practice to the detriment of their learning capability. You will undoubtedly recognize one or more in yourself. When you identify these behavioral enemies you will need to decide whether to keep them or to make the necessary changes in your thinking and behavior to rout them out. Routing out these behaviors is a necessary step to self-empowerment as a learner. Each chapter will deal with other aspects of making your self-empowerment more durable.

These dependency behaviors came to my attention as a result of an observational study I made to discover why so many students who were successful in the Preparatory (pre-freshman) program were academically dismissed the first semester of their freshmen year. This might represent a parallel comparison of good high school students being academically dismissed in their first semester at college. Coupled with this was the problem of students flunking out of the program itself.

While making this study I was involved with all the preparatory students in study skills classes which they were required to take because of their low academic achievement records in high school and on the Scholastic Aptitude Test. It became obvious to me that the study skills course helped some students, but it was not addressing the serious problem of inadequate motivation among the greater number of students. My study began shifting toward the question of student motivation in learning. I discovered five factors contributing to a lack of motivation. The most important was the students' lack of curiosity about what they were learning. For an example, I went to see a physics professor when he was conducting a freshman laboratory class. The students were working on an experiment about specific heat. Four of the students interrupted us to invite the professor to a laboratory blackboard where his lab group were having a problem working with the data of the experiment. I asked the professor if I might ask the students a question. I asked them, "What is specific heat?" These students could not define it and did not have a clear idea of what it was, nor did they know it was important or helpful to their understanding of the subject to know this definition. They had been studying the subject and doing text book problems for approximately four plus days. I could cite many concrete examples of this lack of curiosity within the school environment besides this one and the one in the last chapter. What these students understood was, show me how to do it so I will know what to memorize. This absence of a functioning curiosity is central to the lack of motivation in learning.

Eventually it became evident to me, that the five contributors to this lack of motivation were actually one, which I called a non-functioning curiosity. The other four were motives contributing to the non-functioning curiosity. The other four motives I labeled the motives of a non-functioning curiosity. In this chapter I will identify and discuss these four motives. If you are perceptive you will see in the above example one of these motives in action and the potential for the interplay of the others. You may also recognize the presence of these motives in the students I discussed in the first chapter.

THE FOUR MOTIVES OF A NON-FUNCTIONING CURIOSITY

After eight years of observation, my students taught me a great deal about how students lose power as learners. The four motives of a non-functioning curiosity foster dependency in learning and embody many of the reasons for this loss of learning power. Eventually I discovered these motives to be interrelated and interdependent. These four motives are needs which many students find themselves moved to gratify. I will discuss each motive, with actual examples, to illustrate the dynamics of the motive in the life of the students.

Each motive is part of a continuum from dependency in learning to the self-reliance of the self-empowered learner. The hope for positive change is in the continuum which I will discuss in the next chapter. Each of the motives listed below are dependency needs. These motivational needs are:

1. the need for authority and obedience

2. the need to hold others responsible for us
3. the need for assurance
4. the need for an abortive action

It has been my experience that most of the pre-freshmen students were involved with one or more of these needs when they entered the program. These needs were also prevalent among the students admitted as freshmen. If you as a student have one or more of these motivational needs then you are surrendering your options for choice in how you learn while in a school environment and you become a dependent student. Nevertheless, if you are a dependent learner, who is a good memorizer and can understand directions and follow orders, you may become successful in getting passing grades or be on honors and graduate from college even though your real learning is adversely effected. (There are professors and colleges that gear learning to conformity and regurgitation, and in such situations the students learn they need to develop strategies to get "the grades".) Yet, it is more likely you would be dismissed from the college before graduating because your learning had seriously affected your ability to understand learning that is sequential in nature. Let us consider each one of these motivating needs as I have observed them.

THE NEED FOR AUTHORITY AND OBEDIENCE

The students appeared to need two kinds of authorities. I will refer to these authorities as "authorities in the present" and "authorities from the past" or more simply as "present authorities" and "past authorities". I think you will find the behavioral manifestations of these students are familiar.

Authorities in the present

When I talk with you about "authorities in the present" I refer to a kind of maternal or paternal authority needed by dutiful and obedient students. Such students have a need for someone to give them well spelled out direction which they can follow obediently. They feel that they cannot function unless they have a constant guide. The teacher is viewed as their personal guide to see them successfully through the maze of schooling. I am sure you have heard these kinds of queries. "Tell me what you want me to do?" "How many pages do you want me to read?" "How many pages do we have to write?" Write 500 words, "How many pages is that?" "What's the formula?" "What is the test going to be on?" "Do we have to study this or that?" and so it goes. The need to be directed in detail requires an authority or a guide to be obedient to in all learning. The ultimate end to this dependency is "give me what I need and make me do what I am supposed to do." He is the obsequious student.

Allen came to see me because he was discouraged. He had flunked another test in algebra. After some discussion I became aware that he did not have a sufficient knowledge of factoring to reduce the complex algebraic fraction on the test. I asked him, "These test problems involve the factoring you just finished studying. Do you remember what you learned about factoring?" His answer was enlightening, he said, "I did not do well on the factoring test, and besides that's all over with now and I don't need to remember that anymore." With further observations I found that other students had similar notions and habits about study segments.

John was frustrated and discouraged when he came to see me. "I just flunked a test and it really makes me mad. I knew that stuff before I took the test." "How did you know that you knew, John?" "When the teacher talked about it in class I understood it completely." "Did that prove to be the case when you did your study assignment?" "I didn't have to," said John, "I knew it when I left the classroom." "You did not provide yourself with any feedback on what you thought you knew? That is what study assignments are for, John. If you don't check out your understanding before test time then you must believe in magic." John had an unrealistic trust in his teacher's ability to implant information into his memory banks. He needed a teacher to tell him what he should be doing in college. He viewed his courses as small simple segments that did not need much personal attention.

I asked George, in class, how he was doing in his course in physics, he said, "Not very good." "What are you going to do about it, George?" George said, "Oh, it'll come." I recognized George's dream of learning by the magical powers of osmosis created by the teacher's authority over him. "George", I said, "I have never seen physics traveling. I have never seen it come nor have I seen it go. All I have ever seen physics do is lay around in books, usually on some shelf or desk. So, what do you mean, 'it'll come?'." George had a moment of insight. He learned about initiative. He found he was able to learn physics in a way he had never experienced before.

I found it safe to make the observation that "present authority" students have a tendency to segmentalize learning into lecture-study-test segments, and after each test has passed they declare, "that's all over with, I don't have to think about that anymore", and proceed to forget whatever it was they learned. Such actions do not build a foundation of knowledge but a "destroy as you go" plan, that does not resolve uncertainty in learning but increases the fear of it. It keeps them dependent upon "present authorities." It was easy to see that these students were not getting any feeling of consistency or wholeness about the courses they studied.

I believe this problem of the need for "present authorities" may be partly generated by the fear of not pleasing the teacher and a conviction that schooling is all about pleasing teachers. I have had a great many students, over the years, query me with, "Aren't we suppose to please the teacher?" Many students who fear grades and misunderstand what is required of them, may generate panic about their academic future. What appears to be the underlying difficulty for students who have this motivating need is the feeling that they cannot and are not supposed to deal with the uncertainties that are involved in their own learning. I am sure you have heard students saying, "She didn't tell me to do that." or "He didn't make us do it." The ability to deal independently with the unknowns about the subject to be learned is a talent you need to develop. Since all learning involves subject material that is initially unknown to the learner, it follows that uncertainty is inherent in the learning process. In Chapter 4, the acceptance of uncertainty will be shown to be a necessary aspect of a functioning curiosity and the resolution of our uncertainty is what learning accomplishes.

Do you find that you are too dependent on teacher, instructor or professor to remove the uncertainty involved in learning? Does the uncertainty bother you? Does it worry you, make you feel anxious? I have found students with "present authority" problems can be helped because they are usually open to change. They are open to learning about the functioning curiosity for their own development. It is a positive experience to see these students grow in confidence and ability. What you can do about "present authority" problems will be developed in the next chapters.

Authorities from the past

Students argue against change and resist or refuse to accept a new learning, that is similar to some past learning, and stubbornly hold to their old learning as sufficient, have a need for "authorities from the past." They prefer to stick with their past learning and reject new learning, not realizing that the new method or knowledge may be vital to accomplishing of learning in a future course. Hence these students tend toward being resistors of new learning, believing their past learning will suffice. "Why should I learn another way when I can already do it my way." They argue and fight against new learning. "Who needs it anyway?" Past learning is given precedence. Some students do have real fears and trepidations about taking on new learning that resembles the old learning but is different from it. They fear the new learning will confuse them--mix them all up. They do not perceive that learning two ways or methods of doing a problem would increase understanding and competence. When they feel this bind they are obedient to their "past authorities".

Jim, whom I told you about in chapter 1, an older pre-freshman student in his twenties, was required to take the developmental reading and study skills courses, which he resented, because he felt the implication that he did not know how to read and study. "I don't need reading improvement or study skills!" was his persistent claim. This claim was not consistent with the testing administered and explained to him. Jim felt certain that his past knowledge in reading and study was complete and he did not question his knowledge but affirmed it without question. He had a 3.2 grade point average as a pre-freshman which seemed to verify his contention. Then, as a freshman he was academically dismissed because he did not question the completeness of his past knowledge or his ability to remember the pre-freshman mathematics and physics courses. "I thought I didn't need to study my math or physics because I had it last year", Jim said, "and after I caught on to what was happening it was too late to catch up." Jim did not question his past knowledge or memory, instead he gave it authority and obedience. In another section of this chapter you will discover that Jim made a premature closure.

Tadd had his calculator with him when he and I were talking at lunch. I pointed to it and I asked if he knew how to use its sigma ( ) button. Tadd said he did not. I asked if he would like to know, he said, "okay". I told him the greek letter sigma ( ) is used as a symbol for the summation of mathematical quantities. On the calculator it is used to sum quantities into the memory of the calculator. His calculator had only one memory. I then gave him an example of how to sum a series of products and quotient into the memory and recall the answer. His immediate response was, "I don't have do it that way, I have my own way of doing it." He then proceeded to show me how he used the storage and recall buttons to accomplish the same thing. I told him his method was a good way of doing it but he was using extra steps. He said, "So what, my way works for me." "If you learn both ways you can make a choice.", I countered. "That's Okay, I don't need it." I gave up. A week later he passed my office door. I invited him in for a short talk. My idea was to see if I might convince him that rigidity in his thinking could be a hindrance to his learning and might be harmful to his success as a student. I mentioned the calculator incident as an example of being rigid about taking on new ideas. He listened and said he understood. Had I convinced him? The following semester when he was a freshman I asked if he had mastered the use of the sigma button. "Oh", he said, "I don't need to know that." Tadd graduated as an average student. He had to repeat his calculus which he dropped rather than flunk. He told me it was the teacher's fault he was failed the first time. Tadd, I believe had a good potential but he, like Jim, made decisions about what was and was not worth his learning. It is my contention that it backfired on him in his calculus course due to a decision about not needing to learn some topic in algebra or trigonometry. He displayed an allegiance to his "past authorities".

In an endeavor to help students think about their study habits and skills, I asked them to write reaction papers on what they thought about chapter readings they chose from a list of books about study skills, habits and attitudes. Jason, a student in his late twenties, had been reading one of the books and came into my office in anger, waving the book in his hand. "Who does this woman think she is telling me I don't know how to study and telling me what to do?" I considered the book excellent for the purpose of helping students get a new view of themselves. "Jason, what are you talking about?", I asked, "She thinks she knows all about me and is trying to tell me how I should do things." "Jason, calm down and tell me how can that be? She doesn't know you from a hole in the ground." It was impossible for me to help him change his attitude about the value of the book for him. He was obstinate and set in his thinking. Jason's bias was so strong and subjective it was impossible for him to understand the author's ideas. He did not understand this. He felt it, and he did not like the feeling. His rigid thinking made new learning difficult. He was not successful in his studies. Jason did not understand "objective thinking". If you, the reader, don't know the meaning of "subjective and objective thinking" I suggest you exercise your curiosity and look it up.

It became evident to me that students with "past authorities" needs had varying degrees of difficulty with the uncertainty and change involved in learning. Their "past authorities" did take precedence over "present authorities" resulting in a rigidity in thinking which interfered with their learning. When a student does not want to change, learning can become difficult and even impossible. Yet, it is not surprising to find some students resisting new learning when they fear it will confuse what they already know.

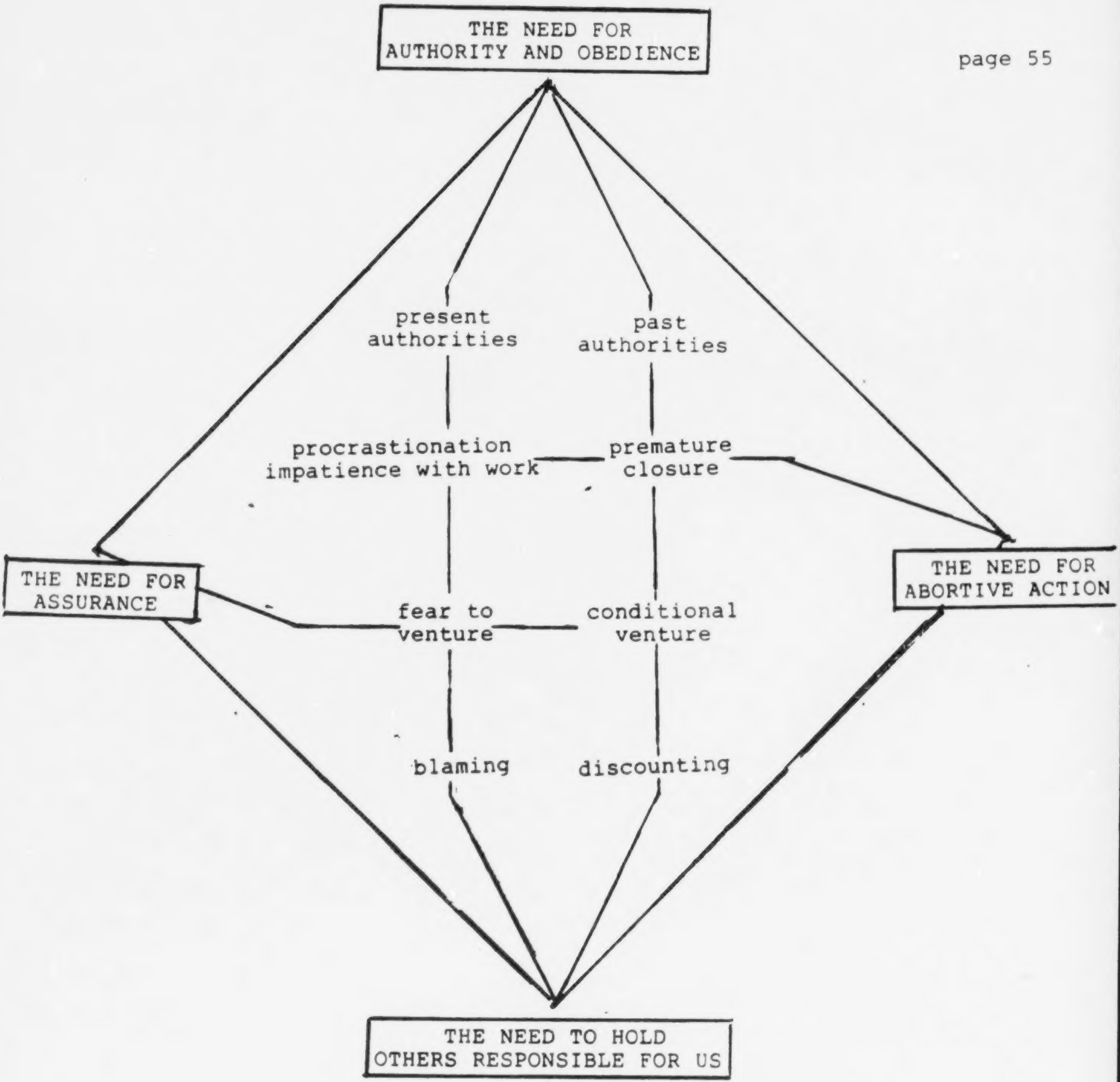
In regard to rigid thinking, I have talked to students about what I refer to as Pre-Galilean thinking. From the Dark Ages to the time of Galileo, the science taught and practiced in the western world was the science of Aristotle and Ptolemy. It was the habit of scientists, of that day, to want all scientific data and information to agree with the science of the past. All data not in agreement with the science of Aristotle and Ptolemy was not considered relevant and was subject to being discarded, particularly if it challenged theological teaching from Rome. The scientist of that day behaved like our students of today with the need for "past authorities" and obedience to them, they argued for past learning religiously and fought against new learning. Galileo, after he built his telescope, challenged the astronomy of his day. "Come", he would say to his fellow scientists, "look through my telescope and see the wonders in the heavens." Most of them would not look. They were afraid of being confused, afraid he was using some magic of occult origins. What they knew satisfied them. What was the need of this new learning? Of course many were afraid of the authority of the church in Rome. The canon law and civil law were dominated by the church which, through its Inquisition, caused great difficulty and persecution for Galileo. Nevertheless Galileo did introduce the world to a new science which required that data be questioned and that the questions be answered. Hence the uncertainty of new data provided the basis to search for a new knowledge. The kind of thinking I see some students doing is pre-Galilean; i.e., accepting "past authorities" without questioning.

This problem of "past authorities" is complex and I believe that the roots may lie in areas other than past teaching or past teachers. I found it difficult to help these students to improve since improvement involves change and that is the last thing to interest them. They have dependency on their teachers and want them to help them learn without changing what they already know. Their only course of action, and have as much certainty as possible while learning, is to follow orders and do as they are told within the structure of the lecture-study-exam system, which means massive tasks of memorization and rote learning. There are some students who have highly developed memory capacities and the ability to use them to get high grades, but I do not believe this to be true of most students.

If you find you lack independence as a learner because of a need for "past authorities" or "present authorities" you will need to examine how you feel about learning and change. Remember, "To learn is to change." As I continue with our discourse about the other three needs of the non-functioning curiosity you will see how the "past authorities" and "present authorities" interrelate with these needs. (see Figure 1)

THE NEED TO HOLD OTHERS RESPONSIBLE FOR US

Students who depend too much on their teachers' abilities to solve all their learning problems tend to lose their direction and are not aware of the plan, order or structure of their courses. Neither the instructor's plan for presenting the course or the overall order and structure of the text book are perceived by these students. Instead they expect, from their instructors, orders with spelled out directions about what they should be doing. If you think of your own experiences as a learner, you might remember if you had fuzzy feelings or no feelings about the structure or direction of the courses you have studied. If you did, who did you feel was responsible? Did it make you feel vulnerable? Having too great a dependency on authorities can make you feel vulnerable. It's a feeling that no one likes. Many students know how to resolve their vulnerability. That's what learning accomplishes. Other students may also develop


THE NEED FOR AUTHORITY AND OBEDIENCE
present authorities
past authorities
procrastionation impatience with work
premature closure
THE NEED FOR ASSURANCE
THE NEED FOR ABORTIVE ACTION
fear to venture
conditional venture
blaming
discounting
THE NEED TO HOLD OTHERS RESPONSIBLE FOR US

THE MOTIVES AND DEPENDENCY BEHAVIORS
OF THE NON-FUNCTIONING CURIOSITY

FIGURE 1

BEST COPY AVAILABLE

strategies to hold others responsible for them and their failures in an effort to escape feelings of vulnerability. It is part of a dependency syndrome which the need for authority and obedience fosters. It is also a cop out.

The need to hold others responsible for us is dependency. I have observed two ways students with this dependency avoid vulnerability. Both hold others responsible for their self-defeating behaviors. Both surrender the power necessary for solving their academic problems. Both are ways to become powerless as students. They are blaming and discounting.

Blaming.

When students fail, suffering occurs. The need to be accountable to parents and college officials such as teachers, deans, etc., fills them with guilt and suffering. When tests or examinations are failed or the students are suspended or dismissed from the college, blaming offers freedom from guilt and a condition of innocence. In this context we hear students blaming teachers for their failure. "Nobody can learn from that teacher.", "She never taught me anything.",or "How can anyone learn in his class, he's so boring." High schools are blamed for failure at college. "They didn't teach us this stuff in high school.", "Everybody in my class had this stuff in high school, but me." Blaming others for our failures has serious implications whenever it occurs. Blaming surrenders the students' power to solve their own academic problems. It becomes the province of the blamed to solve the problem and that seldom happens, and if it does, that student is still powerless. The blamer is a powerless student when he believes that others can be held responsible for his behavior. When the teacher is the problem, the entire class suffers and, as a class, they may be able to resolve the problem. Holding others responsible for their part of a contract is legitimate business practice. There are always two sides of any contract and we are responsible for our part of the contract. This is as true when learning in college as it is in business.

Trudy had great difficulty understanding her physics. When she asked me for help she constantly argued that her incorrect perceptions must be either right or have something right about them. "That's the way the professor taught us.", she insisted, not allowing for the possibility of her misunderstanding. It took considerable effort to give her the help she needed. She learned slowly as her ego gave in and she learned physics. Trudy's rigidity in believing her learning was correct, no matter how far off her thinking was, set her up to be a blamer. I never understood how she developed her strange concepts about what she was learning. She succeeded in completing the pre-freshman program, but she was dismissed from the college at the end of her first semester as a freshman. She appealed her dismissal. At the appeals board hearing, when asked to explain the dismissal, she said, "The pre-freshman program did not prepare me for the shock of the freshmen year." Her blaming left her powerless to solve her academic problems.

Harrison complained constantly about his terrible work load. Talking to him about time scheduling and work planning did not help him. He finally talked himself into withdrawing from the college.

Jeff had difficulty with his mathematics and physics courses.

He constantly lost his temper and exploded about the injustice of his teachers, holding them responsible for his plight and blamed them for the low grades he was getting in his courses. Then one day, late in the semester, Jeff did some reading about habits and attitudes that defeat students and wrote a paper about it for my course, resulting in a turning point in Jeff's life. He discovered he was responsible for rendering himself powerless and that he could change. He worked on his attitude and his behavior and found he could control his rage by listening more and slowing his judgments. Jeff failed his math course and barely passed physics but was allowed to complete the pre-freshman program which he completed successfully. As a freshman he was an honor student. Jeff gained learning power.

Guilt and arrogance are not productive emotions for students, such emotions can produce self-destructive behavior. Blaming and discounting are the actions often taken and these behaviors are destructive of student power. If you want to increase your power in learning you need to seriously consider who you are going to hold responsible for your learning. In the next three chapters I will talk about how you can take charge and be responsible for your learning.

Discounting

Discounting, as we know, means to decrease the price or the value of anything. In terms of money we understand the process of discounting, but other values in life can also be discounted. We can also discount the value of a friendship, a person, a person's worth or the work he does. We can also discount the value of a group as small as a family and as large as a nation, a race or religious group. Some of this is prejudicial and some vindictive. When we talk about discounting we will be referring to how students use discounting to rescue what they feel is their self-esteem or pride. These acts usually have an adverse effect on the student's academic goals.

For example, some students have a tendency to feel and act as if they know all there is to know about all their subjects or one of their subjects. Such students may refuse to study because they are sure they know a lot about their course, not accepting the fact that they have only fragments of knowledge about the course material. This refusal to study is the result of their discounting the value the course has for them, hence, to these students studying these courses is a waste of time. Often these students discount the value of their peers and teachers by taking the position and displaying the attitude that they know and the others do not. They may feel and act as if their classmates are stupid and their teachers did not know their subject. They have a tendency to strut and use other body language to show what they feel is a knowledgeable attitude. They often come across as having a need to impress others with their pseudo-sophistication. In my work with these students it seems evident that all these behaviors are self-deceptions born from a need to cover a vulnerability in themselves which they cannot accept. The effect was destructive to the student's learning. In the examples that follow you can see a relation between discounting and the need for "past authorities".

James made significant contributions to the audio-visual department of his high school by the construction of a projection system that used three projectors and three cameras to develop a panorama with three pictures on a large screen. The system could fade out the picture of one projector while fading in the picture of another projector. He was considered a genius with electronics around the high school. When he applied to enter the college as a candidate for the electronics program the college's admissions department required him to take the pre-freshman program. His high school record indicated his mathematics and physics background was below the freshman admission standard. He entered the program with a feeling of resentment. He was a tall slender youth who emanated an air of intelligence and sophistication except when he sulked, and he sulked about being in the pre-freshman program.

James did not agree with the decision of the admissions department and felt he should have been a freshman in the electronics program despite the assessment of his qualifications. He felt and acted as if his classmates were inferior and he knew more than they did. He started early cutting classes across the board. His instructors wanted to know where he was. He stopped coming to my class. I asked his classmates to tell him I wanted to see him. He would not come. I finally went to his residence hall and asked to see him. The student on duty discovered he had gone away for the weekend. This was Wednesday morning and he would be gone until Monday. It was warning grade time and I needed to submit my grades on the next day, Thursday. Although James had fulfilled the written requirements for my course and should not get a warning grade, I decided to give him a warning grade of "F". I knew he would show up in my office to challenge this injustice.

When I arrived at my office Monday morning James was waiting for me. He wanted to know why he received a warning in my class. I told him I had been trying see him for weeks without success, and since warning grades were not recorded on college transcripts, I thought giving him a warning would bring him around. "Well", he said "it worked." I invited him into my office for a talk. He delineated his discounts and their relation to his discontent. I asked him if he wanted to graduate from the college and how he was planning to do that. We talked about his self-defeating behavior caused by the loss of power to deal with the problem he was creating and how it affected his self-esteem. I gave him the outline to this book, which at the time we were discussing in class, and asked him to read the section covered by this chapter. He related to the section on discounting and saw himself as having an arrogant stance that was adversely effecting his functioning. His quickness to see himself reflected his intelligence and sophistication which I mentioned earlier. James started to change himself around using counseling and reading books that gave him some psychological insights. He was not able to bring his grades up to passing and his arrogant stance so offended the faculty that they could not see sufficient improvement to have him continue in the program for another semester. He was dismissed from the college.

The arrogance of the discounting student is usually difficult to change as was Tadd's, the student with the calculator. Discounting students are often too loyal to their "past authorities" to consider change. James, in my experience, was an exception. If you are a student who is timid or obstinate about enlightening and expanding your past knowledge and rigidly hold to past learning, giving it authority over new ideas, then you may need to realize that you can develop a greater trust in your own capacities to learn many new ways of doing and understanding new methods and ideas. You can find stimulation in adding new knowledge and expanding your mind. In brief, move toward the excitement of dealing with your vulnerability by resolving the uncertainties you experience in your course work. That's what learning is about. More will be said about this in chapters 4, 5 and 6.

THE NEED FOR ASSURANCE

The need for assurance is a need to be assured that what you have done is good, alright or acceptable. In one situation it may be the need for assurance for what was just finished, "Is this done right?". "Is this okay?", etc. In another situations it may be an assurance for what you already know from your past, "Why do I need to learn that? I already know how to do that my own way." Hence, I see the need for assurance in two kinds of behavior as a fear to venture and as a conditional venture. The fear to venture I associate with "present authority" students, who lack confidence in what they are doing; and conditional ventures of "past authority" students, who lack confidence in their ability to change habits. The expectations for assurance from each are quite different; "present authority" students tend to be passive until they become blamers, "past authority" students tend to be aggressive.

Fear to Venture

Students who fear to venture show little confidence in their ability to learn and to do their work. Their plea, "show me how to do it", is followed by, "Did I do it right?", "Is this okay?" or "How am I doing?". They want their work done right but they haven't any confidence in their own abilities. They do have the notion that other students "have it" and they don't. Such behavior is not appreciated by many teachers or classmates for very long. If these students are rejected, rather than helped in resolving their dependency, they may become afraid to let others know they don't know and don't understand their studies and lack confidence. They becomes afraid to be known for what they think about themselves. As a result they don't voluntarily speak in the classroom. They often go into hiding; i.e., withdraw into themselves and study alone in their room or in an isolated corner of the library. I have seen these students flunk out of college, but I also discovered they were the easiest to help. When these students experienced a real success, their confidence increased and their learning abilities grew.

I think it is safe to say that most teachers or professors of freshmen or pre-freshmen students have had students who never spoke in class. I was such a student myself when I was in college. Withdrawn into my shell I played the dangerous game of being safe. I broke my silence by taking what I thought was a great risk. I spoke out. After the first time it became easier. As a teacher I found many students afraid to speak out voluntarily in class and some who felt uneasy or uncomfortable when called upon.

Gary was a good soccer player who wasn't doing well in his studies in the pre-freshman program. His mathematics professor said he "just didn't have it" It was an assessment I could not agree with.

I felt he was bright enough, but lacked confidence and felt too confused to settle down and work it out. He did not seek help. Gary also had difficulty with physics. He failed both courses and was dismissed from college. Two years later Gary visited and told me he was a attending a community college in another state and had a "B" grade in calculus. He had been working with a surveyor who encouraged him to go back to college. Gary now has a Bachelor degree in civil engineering.

Bert, a married student and an outgoing person, was doing poorly in his studies and he became defensive and withdrew into himself. He studied alone and kept to himself and flunked out of college. Later we heard he was doing well in a school for aviation mechanics.

Darryl, Dave and Connie were students I met with after I developed this material for use with students. I want to tell the story about each of these students individually. Darryl entered my course (Learning Dynamics) with a lot of fear to venture. He sat in the class as if he was a coat laid across a chair. I could not help him because he wasn't listening. He was a passive student. He drove me to an action I did not usually use. I told him what I felt in blunt terms. For instance, "Are you coming to class today to take up space.", or "Why do you lie around like you were dead." He decided to listen and work on what I was saying to see if I was "full of it". In about four weeks he was a dynamic participant. He said in his evaluation, "When I moved toward my vulnerabilities and did things you talked about I was surprised. My confidence soared." Darryl ended up with honors in the pre-freshman program and graduated on honors with a

Associate degree in Electronic Technology.

Dave, a freshman student, was having so much difficulty in his first semester he transferred to the pre-freshman program in order to stay in the college. The instructor who tutored him in mathematics said he lacked the basic skills and seemed a hopeless case. I am sure, had I been his tutor or teacher, I would have been frustrated and considered him hopeless, but I did not have this kind of experience with Dave. To me, he looked timid and confused and afraid of mistakes. He joined a small class I set up to talk about motivation and learning. The material of this chapter visibly turned lights on in his head. I could see it in his facial expression. I cannot say what it was he perceived or experienced, but Dave learned why he was so vulnerable as a student and he moved toward his vulnerabilities and began resolving them. The result was amazing. Dave became an honor student in his second semester of the pre-engineering program. He graduated from the college a little below honor level. He never stopped looking timid.

Connie lacked confidence in her ability to understand physics. "I'll never be able to understand this stuff", she kept telling herself. She held herself in low esteem regarding her abilities to understand physics. Connie discovered, on her own during the semester, that she was in charge of these feelings and what she was telling herself. She made a decision to discover whether she could learn physics. She was amazed at how much she could understand and how well she could do. Connie became a good student in physics.

None of these students were excited about grades. What "turned them on" was the discovery that they could learn on their own.

The grade just happened. As Brian said, "I know my stuff" and, "When I studied for the final I found I remembered all that stuff from way back." (emphasis added) Grades lose their significance to "present authority" students when they find out that they can learn on their own. They no longer felt the degrading experience of being so teacher dependent. Life at school was more than merely doing what they were told.

If you are a student who has a fear to venture and needs assurance and support you need to face your vulnerabilities and resolve them. Then you will find your confidence growing. Ignoring them makes things worse. Resolving your vulnerabilities results in learning. The need for assurance should dissipate and "past authorities" will become less important. There will be more about this in chapter 4.

Conditional Ventures

Students who practice conditional ventures require or demand assurance and support for their own views and ideas before they can learn or comply. "What do I need to know that for?" poses the demand for assurance. His or her tone implies a resistance to change. It is a BIG QUESTION and his or her own to get answered but he or she will let become a problem and demand support and agreement. He or she usually loses. Disagreement brings them a feeling of uncertainty which may either confuse them, make them feel they are wrong, or make them feel discounted. They tend to argue for conditions to avoid the feeling of vulnerability. If the teacher insists on a view that is different from that of a student's view, this student tends to ignore it. They have a need for approval whether they are right of wrong and find it hard to comply if their conditions are not met. For example; some students are threatened by the idea of seeking help or being assigned for help in the college's learning center. If a teacher or a counselor tells a student he should seek such help they may feel it a put down, a place for the dummies or they feel their ways are in question and change will be required of them. They argue for the approval not to attend, on the pretext that they don't need it and its a waste of time. If it's denied they just don't show up. Sometimes they can be coerced into making arrangements to seek help but a consistent follow through is unlikely. For them venturing, without their conditions, appears fearful. It is difficult to get "past authority" people to seek help. The conditions that get "past authority" students involved are their grades, however these are controlled by the teachers and required by the college so students seldom if ever have any say in the conditions that determine grades. The method used by these conditional venturers to meet grade requirements is mostly memorization since memorization results in less change than learning for understanding. This seems to be a bleak picture but I am sure it is familiar.

James, whom we discussed earlier under "discounting", had a lot of conditions he wanted satisfied before he would begin his course of study. His major condition was that he be placed in a freshman class in electronic technology. He evidently never accepted the reasons for his being placed in the pre-freshman program at college and as a result cut classes and did little productive work. His conditions became a major contributor to his being dismissed from the college.

Sue asked for help in her mathematics assignment. She had an unspoken condition, "Do not explain or help me understand mathematics, I'm not bright enough for that, just show me how to do it so I can pass the test." In Sue's case I could see her resist any change in her beliefs about her abilities. I am sure, in her anxiety, she was afraid of the responsibility that would come with the change. There is such a thing as being affraid of success if the expectations of other people demand that the success continue. Such expectation can be scary. Sue may have had such an experience. She did not want to understand mathematics, she wanted to "get by" and she wanted my support and approval for the condition to "just show me how to do it". Her teacher wanted more than reproduced solutions on tests and would vary his test problems to introduce this challenge. Sue's rigidity was setting her up for failure. It was not easy to change Sue's view of learning.

Tadd, the student with the calculator, preferred to ignore me rather than risk becoming confused by learning another method of summing numerical data into the calculator memory. Another student did not want to learn how to write in his English composition course. His argument was, "I'm studying to be an Engineering Technician not a writer." His conditional venture resulted in a low grade.

Conditional venturers are not adventurous learners and they do not have any comprehensive view of their learning. They compartmentalize their courses and set conditions for learning which endanger academic success. This habit of setting preconditions for learning appears to result from thinking that gives precedence to "past authorities."

THE NEED FOR AN ABORTIVE ACTION

I see two different kinds of abortive action behaviors in college students, (a) avoidance, and (b) the premature closure. Avoidance behaviors are acts of quitting, procrastinating or rushing to solution just to get things over with. The premature closure is an action of closure found in problem solving. The closure is made before all the data necessary for a proper solution of the problem is in hand and understood. Hence the problem solution is incorrect. Premature closures are caused by personal bias, rigidity in thinking and laziness about understanding the data. I identify avoidance problems with both "past authority" and "present authority" students. The premature closure I perceive as a habit of "past authority" students. Let us look at the avoidance behavior and the premature closure.

Avoidance Behavior

Students, may be exhibiting avoidance behavior, who have to sharpen their pencils, get a drink of water, straighten out their desks, say "hello" to their friends in the dormitory, get another pack of cigarettes or a candy bar, etc., before they can settle down to study. The most common avoidance action of which we are all guilty, is procrastination, the habit of putting things off to do later. It is the cause of all sayings such as "do it now" and "don't put off until tomorrow what you can do today", etc. Because procrastination is so prevalent there is big business in producing and selling materials to business and professional people for managing time. Study skills books usually devote a chapter to time management to help students get their college work done on time. All students must learn a way to manage their time to decrease the time spent procrastinating. There are some identifiable reasons why students procrastinate. Some students come to college without any real commitment to their education. They lack goals or their goals are unclear and poorly defined. In my experience, as a counselor in the two year colleges, the lack of commitment and the lack of well defined goals and objectives leads students into being wistful and pensive about their school work and this leads to being open to distractions which in turn leads to procrastination. It becomes easy to leave study to play pool, join a rap session at an eating place or bar, or go out on a date. Any activity would be more acceptable than study when commitment is low and the students are pensive and worried.

Many students are impatient when doing their study assignments and they want to get them over with quickly. So half done or not done becomes a pattern. I have had students pass in a written paper on 8-1/2 by 11 paper with 2-1/2 inch margins in an effort to decrease the amount of writing. Some students rush through their assignments in mathematics and give up so easily that many of the problems and examples are incorrectly done, partially done or not done at all. This kind of behavior gives faculty the impression that some freshmen students have the notion that the associate degree is awarded for hanging around the college for two years. I have heard resident students who do excessive partying to the detriment of their studies say, "I can't say no to everyone who wants me to go with them. After all I have to live with these people."

If you, as a student, want to stay in college and need to master the problems of procrastination and develop good work habits, there are many good books on study habits and study skills to help you understand the organization of your college work load. Mastering the use of time can help you learn when to work and when to play.

The Premature closure

One of the greatest difficulties in teaching students study skills, reading improvement or motivation is the rush to judgment some students make, about the lack of value these courses have for them. Without any real assessment of their own situation or the course content they will declare the course a "waste of time." My better students will say they made a premature closure. It is a premature closure because their bias disallowed the consideration that they might need the course to improve their attitudes, methods and motivation.

Chad was not doing the work in my class on motivation. He was an older married student and came to college with the determination to get an education. I called Chad into conference to discuss the poor quality of his work. As we talked, he said, "I don't need this course. I don't need to read those books. I didn't come to college to waste my time. I am already motivated.". "Okay Chad." I said, "Let's check out your motivation. In class, this past week, we have been talking about using questions to learn and to understand Newton's Second Law of Motion." I opened the text book to the law and asked Chad to explain what the "unbalanced force", as stated in the law, was and what it meant. He could not do this. We then used questions to analyze the law, discover its meaning and its relation to Newton"s First Law. (I will do this in chapter 6.) Chad discovered that by knowing and understanding Newton's laws he could understand the assigned problems and do them without depending on rote memory. I then said to Chad, "The reason you did not learn to do this kind of analysis before today was because you were 'already motivated'". Chad's expression was one of surprise and wonderment. He learned he had made a premature closure about the course. He also learned that motivation for learning was different from the determination to succeed in college which can produce different motives other than that of a functioning curiosity, and these different motives were more about getting grades than acquiring knowledge. His premature closure seemed to be affected by his determination to get grades.

Peter took a history test. It was an objective test with multiple choice questions. One of the questions posed the condition, "Assume that the United States and their allies lost World War I." Peter could not read this condition correctly. His bias was a belief in the ultimate strength of the United States military and his feelings of patriotism. His eyes could not see and his mind could not accept the words "assume" and "lost" and he chose the answer accordingly. His obvious premature closure resulted in a wrong answer because his bias did not allow all the correct data to enter his solution to the problem.

To illustrate the premature closure in a simple mathematic problem I have used some variation of the following problem.

A furniture store manager discounts a bed by

> 15 per cent. The new sale price is $344.99.
> What was the original price of the bed before
> the discount?

The most common solution my pre-freshmen students gave for this problem is: ($344.99 x 0.15) + $344.99 = 51.75 + $344.99 = $396.74. I tell the students that this answer is wrong because of a premature closure. This surprises many students. I then say to the students, "In any problem, asking questions about the data can prevent premature closure. Question: What does the 15 per cent relate to--the original price or the discounted price?" The students all agree that it relates to the original price. "But", I say, "the 15 per cent was not multiplied by the $344.99 when it was discounted. Why do you do it now?" It is a premature closure to assume all problems of one kind can be solved in the same way. Similar looking problems of the same kind most probably have different solutions. Let us look at the correct solution. Let X = original price. Then we can write a simple equation that will say "The original price (X), minus the percentage (0.15X) will equal (=) the discounted price (344.99). i.e., X - 0.15X = $344.99 which is 0.85X = $344.99 then X = $405.87. The importance of questions and their use in analyzing and understanding data is discussed in chapter 6.

There appears to be three reasons for premature closures in problem solving, 1) personal bias and rigidity in thinking, 2) a lack of adequate knowledge to understand what data is needed to solve a problem and 3) laziness. Everyone has biases. Many people understand their biases and understand why they value them. Other people have biases harmful to others, as prejudice, or harmful to their own learning and growth, and they fail to see them in themselves and do not understand their effects on their learning. It is due to a distaste or fear of change. As a student you may need to examine how your own biases affect your learning. Do they prevent you from being open to learning? Do you find you are too rigid to listen to a new idea? If you have biases that result in poor learning or inadequate learning you may end up making premature closures on tests and examinations.

THE INTERACTIVE RELATIONSHIPS OF THE DEPENDENCY MOTIVES

The total picture that illustrates the relationships among the non-functioning curiosity's motives and behaviors is represented in the diagram shown in Figure 1. Here we see the need for authority and obedience fosters the need for "past authorities" and the need for "present authorities." The other motivational needs and behaviors are influenced by this dichotomy. The "past authority" students tended to be rigid. Rigid people are much more likely to make premature closures and set their own conditions for venturing in learning. They tended to give discounts to teachers and others who insist on change. "Present authority" students tended to need encouragement and directions and external discipline. They tended to blame their failure on their authorities. They were unsure of themselves and feared to venture and tended to procrastinate and become impatient with their work. Of course there is crossover since such things as blaming and procrastination are not unique to any group of people. A study of the diagram should help you decide where you may need to make changes.

The interdependence between these needs is so linked that any change in any of the needs results in changes in all the other needs to the same degree. That means that if you decrease the need to hold others responsible for your failures by accepting responsibility for your behavior you will decrease your need for abortive actions, the need for assurance and the dependency needs for authorities. You will see how this acts when we discuss "the continuum" in the next chapter.

SUMMARY

In the beginning of this chapter I said becoming a self-empowered learner required work, not just a declaration of freedom to learn. In this chapter I have set down behaviors which are destructive to the academic success of students. These behaviors contribute to a non-functioning curiosity because they inhibit any natural inquiry so necessary to learning. You may need to consider whether you have any of these enemies to self-motivated learning to rout out of your thinking. This is important if you are to free your mind to work for you in your learning. It is important because "curiosity of inquiry", seeking and searching basic to the acquisition of knowledge require freedom. These natural abilities should not be hindered in your learning activities.

Curiosity works well for most students outside the school where they learn to rebuild engines, make electronic components, learn computer programming skills, gain entrepreneurial skills, write poetry or a story and so on. They do not always use the best judgment, but they are curious and accomplish much outside of school. While in school, where they are being warned that "curiosity killed the cat", they are also being told not to ask so many questions, and to listen and learn. Learn what?--to be passive students. Many passive students arrive at the two year colleges I have worked for void of all curiosity in academic studies. I believe that it is possible for these students to recover their curiosity and become active and productive students. I have accomplished this with many students.

Some students found the material of this chapter uncomfortable reading. All of my students have found themselves in at least one part of this chapter, more often in several parts. If you have found yourself in this chapter then you have work to do, if you want to undertake it. In Figure 1 we see that the dependency need for authority and obedience generates a need for "past authorities" and/or "present authorities." These authorities pervade all the other needs. We will discuss how to deal with these culprits as we discuss the self-reliant learner and the continuum in the next chapter. In chapter 5 I will talk about what an aware student is like and what he is about. In chapter 6 we will be ready to talk about the functioning curiosity at work.

Oh yes, speaking about the "curious cat," there's a second line that make a rhyme.

"Curiosity killed the cat;
"Satisfaction brought it back."

CHAPTER 4

THE FUNCTIONING CURIOSITY

Self-reliance in Learning

Your self-empowerment as a learner can begin with the identification of the characteristics of a non-functioning curiosity, as they apply to you, but in order to rout out these enemies permanently new attitudes and motivational needs must be learned and developed. This chapter is about these attitudes and motivational needs which students can use to make the necessary changes to empower themselves as independent self-reliant learners. This chapter will concentrate on the character and motivational stance of the student with a functioning curiosity.

Two steps that need attention to empower your learning ability, (a) to understand the "motive of a functioning curiosity" and to develop this motive for your own learning purposes and (b) to understand each characteristic of the functioning curiosity and to determine its value as it applies to you. This chapter will present these characteristics in an idealistic way to set goals for striving. It is not designed to tell you how to be perfect. There is no way I can spell out "a way" for you to follow. You must do your own thinking about what I tell you. What you do is your decision. It must fit your own person. Hence the criticism "that no one could be that good" is not valid criticism of this chapter. Yet, this chapter is about the kinds of actions you may need to consider if you want a new and useful motivation for learning. These actions which await your decision and your experimentation require taking risks. Your self-empowerment as a learner will require taking such risk. The risk inherent in learning involves personal change. Such risk can bring great rewards and satisfactions.

Many freshmen and pre-freshmen students in our two year and four year colleges need active curiosities that function purposefully in the educational environment of their college. (It certainly was a problem of mine throughout my days as a student in school and college.) Many beginning college students, as I have said before, need to discover how to use their curiosity to become independent learners in order to stay in college and graduate. "How could I help students gain a functioning curiosity?", was the question I needed to answer.

After my study about why students of good potential failed or did poorly in college as freshmen or as pre-freshmen, I started pondering about what could be done for students with a non-functioning curiosity. It seemed logical that a "functioning curiosity" should also exist. The question I asked myself was, "What are the characteristics and motives for a functioning curiosity that would be useful to a student's learning in college?" In answer to this question I found only one motive which I called the motive of a functioning curiosity. This motive was discussed in chapter 2 as "the need to know and to understand." However, I discovered four characteristics for the motive of a functioning curiosity, which I labeled "the characteristics of a self-reliant learner." The process of thought I went through in discovering the four characteristics also led to the discovery of a continuum. (see page 106) Let us look at this development.

THE FOUR CHARACTERISTICS OF A FUNCTIONING CURIOSITY

In answer to the question, "What are the characteristics and motivations of a functioning curiosity that would be useful to a student's learning in college?", I set down the four motives of the non-functioning curiosity on paper and considered what might be the possible causes of these motives. I came up with the following four causes:

(1) "The need for authority and obedience": This need, of some students, generated by their feelings of insecurity when dealing with or working with situations involving uncertainty, ambiguity or change in study and learning. There is also a need to have these uncertainties resolved by their authorities

(2) "the need to hold others responsible for us": A need, of some students, to blame others in order to escape the feelings of vulnerability that come with failure and of the consequences of being held accountable for such failures.

(3) "the need for an abortive action": A need, of some students to avoid being responsible for school work in relation to acts of procrastination, the rush to get work over with and/or the inability to think

things through due to bias or laziness.

(4) "the need for assurance":
A need, of some students, for nurturing or approval due to a lack of self-confidence or self-esteem about their abilities to perform academically or their need to have their ideas accepted, approved and agreed to without equivocation.

The next question I asked myself was, "What can a student do to prevent or replace these dependency motives that would have a positive effect upon her/his learning?" The answer to this question, I believed, needed a basic plan of action that would give independence and self-reliance to the learner. For the answer I looked to the four causes of the non-functioning curiosity and pondered about what would be the antidotes. I extrapolated the four characteristics that would be on a continuum with the four motives of a non-functioning curiosity and would be behavioral opposites to them, i.e., self-reliance as opposed to dependency. The four characteristics, I selected, for this self-reliant learner I call the characteristics of a functioning curiosity. These characteristics are:

(1) The acceptance of uncertainty

(2) The acceptance of our vulnerability

(3) The development of responsible action

(4) A growing confidence in one's self

The substance of these characteristics I extrapolated, i.e., I inferred from what I understood of the non-functioning curiosity to be the opposite characteristics needed for a functioning curiosity and a self-reliant learner. I then tested these characteristics by observing student performance after I introduced the ideas to them. The students who worked to adapt the characteristics learned how to master their courses. This resulted in high scores on teachers' tests. These characteristics have many realistic implications about what learning in college needs to be about. Let us consider the implications and the ramifications of each of these characteristics and finally discuss the continuum.

THE ACCEPTANCE OF UNCERTAINTY

It is important for you to know that a student with the motive of a functioning curiosity is not teacher dependent. This student takes charge of his own learning. Teaching is the teachers' "thing", learning is the students' "thing". If you learn how to learn, teachers can become your valuable resource persons. It is therefore important for YOU to learn that you can and must deal with the uncertainties of YOUR OWN LEARNING. The first step is to accept the fact of this uncertainty in learning and become comfortable with it.

The acceptance of uncertainty in learning implies you will resolve the uncertainty. Learning materials new to you, whether ambiguous, confusing or involving change, presents uncertainties you must deal with. The resolution of these uncertainties results in the learning you want. This is what learning is all about. Do not look to your teachers or professors to resolve the uncertainties by "getting the material across" to you. This only puts you into the precarious position of always hoping to get those "good teachers" who will insure that you will pass their tests with the probable results of minimal learning. Knowing how to resolve uncertainties of learning will solve a lot of your problems in learning and start you on your way to being an independent learner

The resolution of uncertainty in learning results in mastering the knowledge to be acquired. The students with a functioning curiosity use controlled inquiry to resolve the uncertainties in learning. They ask themselves questions. That's right, curiosity needs a question in order to function. Every question we ask ourselves lets us know what our job is while learning and that job is to search out and find the answers. That's right. The acquisition of knowledge is accomplished by inquiry. In this sense, learning is self-questioning. In chapter 2, we said, the scientific method for learning has two steps, 1) ask yourself a question, 2) Get an answer to your question. You might ask, "Where do you get these questions?" Your best source is your text book-- I will discuss this later. Questions are the most important tool for a person with a need to know and understand. Questions will systematize your learning for understanding, for communication and for mastery of the material to be learned. Kay, who changed her idea about questions said, "This class showed me that questions do not indicate stupidity but are to one's advantage." Your best teachers do not discourage questions or label question askers as stupid.

The acceptance of uncertainties also is the acceptance of change. A person with a functioning curiosity discovers that when uncertainties are resolved and learning results, his/her habits, beliefs and values change. To this person learning means changing and he or she looks to these changes as a way of developing his or her life. Growing is a process of change.

Another important dimension to the acceptance of uncertainty in learning is to understand the illusory nature of certainty. Let me illustrate what I mean. I watched a television program where a panel of clergymen and a moderator were having a discussion. The clergymen were from different faiths. The Protestant clergyman happened to be a physicist before he studied for the ministry. Because of this background the moderator asked him, "Don't you find as a minister, the work you do with people is filled with more uncertainty than your work as a physicist was? Doesn't a physicist who works with the concrete science of physics experience more certainty in his profession?" The minister's reply was insightful, "I would not put it that way." he said, "The certainty we experience in our work and in our life is more a function of the narrowness of our perceptions." The search for certainty in life and learning brings a narrowing and closing of our vision and a diminishing, a decreasing of our capacity for perceiving, for learning, and for growing as we seek the security of "no change". It is by accepting uncertainties in our life and dealing with them, and constantly resolving new uncertainties that we grow, increase our knowledge and learn how to think. People who need certainty will resist change. They will find learning difficult because to them learning is training and memorizing. Why? I believe it is because such methods of learning minimize any personal change. This kind of learning lacks the capacity for subject mastery. The acceptance of uncertainty and the resulting personal change that comes with its resolution is important in developing the art of thinking. The consumer's advocate, Ralph Nader, tells the story of his father asking, when he was a boy, "What did you learn in school today? Did you learn to believe or did you learn to think?" This is an excellent question, for I am convinced that the ultimate gift of an education is learning to think. The former prime minister of England, Harold MacMillan, said, at an Oxford University commencement, "the purpose of liberal education is to be able to tell rot when you hear rot." That talent takes a special kind of thinking that requires questioning what we hear.

THE ACCEPTANCE OF OUR OWN VULNERABILITY

We have all felt vulnerable at one time or another. Many of us have experience being vulnerable when stopped by the highway patrol for speeding, stood guilty before a judge, accidentally broken someone else's chinaware or when someone in a knowing attitude said, "You mean to tell me you don't know --- --." I have found that I can be vulnerable in situations that require quick judgments when I need time to think. In such situations I am apt to make a wrong choice or decision, and then I have to live with one more missed opportunity. Vulnerability is one of the hazards of the school environment where teachers ask questions and give tests and examinations. Most of us, as students, have felt vulnerable. It is important for students to learn to face these vulnerabilities. Denying them and blaming others may help you escape your responsibilities but you will lose your power as a student and end up being insecure. Accepting the fact of your vulnerabilities is important because it implies a necessary self-confrontation. Let us develop a useful understanding about vulnerability in relation to learning in school.

The dictionary definitions of vulnerability includes a) capable of being wounded or physically attacked; b) open to criticism, attack or easily hurt by adverse criticism, c) affected by specific influences, e.g., temptations, social and political pressures. All these definitions imply inward feelings of insecurity. Such feelings also give rise to feelings of inadequacy about school work which are reinforced for some of us by repeated test failures and sometimes by the behavior of some teachers who denigrate their students for not doing well. For these reasons many students find schooling a precarious undertaking which leaves them with a pervading feeling of vulnerability. Who are the students susceptible to this vulnerability? We discussed them in the last chapter as having the motivational needs of a non-functioning curiosity. Their vulnerabilities are generated from a need for authorities, past or present, to resolve the uncertainties they experienced in learning. Many of my students had these feeling of vulnerability about themselves and their scholastic efforts. They wandered about the college acting as if they were lost with no plan of action or any ability to rescue themselves, yet many of them were capable students with the capacities to excel in college. As students they were vulnerable. If you are one of these students, what can you do about your vulnerability?

Accepting our vulnerabilities and facing up to them is the crux of "what it takes" to become a good learner and consequently a good student. This means confronting your feelings of vulnerability. If you can not accept the fact of your own vulnerabilities and confront them, i.e., move toward them and do something about them, your situation as a student will not improve. It may worsen. Confronting your vulnerabilities requires objectivity, i.e., a scientific or analytical detachment. Ask yourself, "Why do I run from my vulnerabilities in learning and what will I do about it? Once this confrontation is made a lot can happen for you. Cathy made such a self confrontation when she concluded, "I have always been afraid I could never do this physics, that's why I'm so vulnerable. I am going to be objective, and set aside my feelings and seriously find out if I can learn this physics." She was surprised to discover how capable she was. I have found that the need for "past authorities" fosters a lack of objectivity for confronting one's vulnerabilities. Cathy decided to stop listening to the little girl in her head who did not do well in science in the grades. Students with this need may view themselves as not having a problem, but tend to put the problem outside themselves and on to the environment. I believe they would view the personal change involved in a self-confrontation as too threatening and a risky business. Introspection is something they do not do very well. If you are a student holding to authorities of the past or present you need to discover that learning, if it is done well, always involves risk. What it comes down to is this: "The learning power of the students with a functioning curiosity is due to their capacity to assume the risks of learning in the school environment by taking charge of their own learning. Such risk taking means objectively facing up to our vulnerabilities by taking charge of resolving the uncertainties involved in learning. Hence the personal sense of powerlessness and dependency of being just average must be confronted. Too many students do not know how great their potential is because they never tried to find out. I can testify that the number of students on honors increases as more students realistically try to find out how well they can learn. It is important to understand that in college the student should not be under the care of the professor. The students who take charge of their own learning have their professors as their most reliable resource persons, as their lecturers and as their friends, barring personality clashes.

In brief the students with a functioning curiosity accept their vulnerabilities as a way of learning and growing. When they discover they have an area of vulnerability it becomes a clue to some learning that needs to be done. These students do not create situations of vulnerability for themselves by strutting their past learning and insisting that what they already know is complete and sufficient. Instead they constantly raise questions to answer in order to learn, thus eliminating the cause of their vulnerability. The acceptance of vulnerability and uncertainty go hand in hand with the challenge of learning about what they don't know. Learning is the business of the students with a functioning curiosity.

Here is what Darryl said in his evaluation of my class in motivation, "This class made me see my vulnerabilities, which I think was the most important information anyone could gather from the class.

Once I realized where I was vulnerable I could move towards them and try to correct them. A couple of my vulnerabilities, that I've always had, were deciding myself to do my homework and procrastination about my homework. These factors were always a problem for me in high school, I would always find something better and more fun to do besides my homework. Now I am able to apply myself if I want to. That leads me to another important point that I realized from your class that is the desire (or wanting) to do my homework.

"I have realized that you need to build an achievement motive, aims, goals, and most important a functioning curiosity. All these things I have been trying throughout the semester because they made so much sense to me and in so many instances they pertained to me. At the present time I am at the top of most of my classes; I am not only receiving good grades but I am gathering information and learning it so that I really understand it. This understanding gives me a deep down rewarding feeling and makes me feel proud. These things are why I have gained such confidence in myself which I never had before." Darryl graduated from the college in the electronics engineering technology program with a cumulative grade point average of 3.4, in his third semester he had a 4.0. The goals were learning, education and competence but not grades.

DEVELOPING RESPONSIBLE ACTION

"Responsible action" connotes self-responsibility for actions taken in learning. ACTION is a key word equal in importance to the word RESPONSIBLE. Action, as it applies to learning, is not usually understood, among students with poor or marginal performance. The concept of responsible action as it applies to learning is so important to your success and to your empowerment that it needs special attention. When you have learned to use responsible actions as set out in this section you will discover that the time spent on study decreases significantly. Your understanding will increase. The result will be better than any methods relying on memory alone.

"Be Responsible" is a sign I kept on the wall for student to see. It had different meaning for different students. Most often being responsible was interpreted to mean doing what the teacher told you to do. Seldom is it viewed to mean responsibility for themselves. Yet, learning in college is a commitment to prepare yourself for the kind of life you want to live and the kind of service you want to offer. Hence the action you take in learning must be geared to YOUR EDUCATION. Hence, responsible action, characteristic of the college students with a functioning curiosity, requires that learning have purpose and that it be mastered. The need to know and understand is the kind of a motive that will involve students in a set of actions necessary for mastering knowledge. These actions, consist of a set of learning strategies centered around a controlled inquiry, i.e., asking questions, getting answers, validating answers, and systematizing the answers into a consistent whole for internal communication then external communication whether for an examination, essay, speech or report, etc. Before discussing these learning strategies-- some thoughts to set the stage.

Responsible action in learning is self-confrontational. There are two kinds of self-confrontation:

1) Asking questions of yourself when you study, listen or

read. Such self-questions are confrontational when you put an onus upon yourself to find the answers. Asking a teacher questions makes a confrontation that puts the teacher to work. Asking self-questions makes a self-confrontation that puts you to work. When you find the answer you have learned.

2) Self-confrontation is used to validate what you have learned so you will know that you understand what you have learned and can use what you learned. Validation asks the feedback questions, do I know?, do I understand? and can I apply what I know? If you do not confront what you have learned for this kind of feedback you cannot know that you know your stuff.

Self-confrontation gives meaning and direction to learning. "A life without confrontation is directionless, passive and impotent."[1] It is not a good thing to enter any exam with unvalidated learning, because you failed to check out what you have learned.

Dealing with Uncertainty

Using Inquiry in College Learning

> "Questions are the engines of the intellect, the cerebral machines that turn energy into motion and curiosity into controlled inquiry. There can be no thinking without

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1. Carkhuff, Robert R. and Berenson, Bernard G., Beyond Counseling and Therapy, Holt, Rhinehart and Winston, 1967, p. 170

questioning..." David Hackett Fischer[2]

This quotation contains three words that require defining in the context in which we will use them. The three words are question, intellect and thinking. Intellect is the key word here because the definitions of the other words must relate to what we mean by intellect.

> Intellect: The ability to reason, understand and to perceive. This also implies an ability to systematize learned knowledge.
>
> Question: This word has two meanings for us, 1) an interrogative sentence as in asking to learn, e.g., "What is a gerund?" or a stated word problem and a problem open to discussion or inquiry as a hypothesis or 2) a question framed for the discussion as in a classroom or as in the U.S. Congress.
>
> Thinking is to determine, resolve, to work out, etc by reasoning (using the intellect). Also to conceive, remember and recall.

Fischer's quotation has three important implications concerning the use of questions in learning. First, Fischer makes the powerful assertion that questions are prime movers of our intellectual energies, and that questions turn this energy into motion. When the intellect moves, thinking occurs. When I talk about questions I am talking about self-questions or questions to yourself. Many of my students have found that self-questions do get their thinking moving and also create motivation and interest. Reading teachers teach the use of questions as a reading technique to stimulate thinking while reading. Questions are the prime movers of thinking in learning.

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[2] Fischer, David Hackett, Historian's Fallacies, Harper and Row, Publishers, New York, NY, 1970, p3.

Second, Fischer said questions "turn curiosity into controlled inquiry." This infers a controller for your inquiry. Who is this controller? Right! YOU! You are the controller in charge of the inquiry. Questions can be used to control your learning. By using self-questions you take charge of your own learning and the teacher becomes your important resource.

Thirdly, Fischer says, "There is no thinking without questioning." Is this true per the above definitions? Is there any productive thinking about learning without questioning? In reading a text you should use chapter heading, section headings and italics and bold face type to formulate your question to yourself, thus turning reading into a seeking and searching activity which highlights the ideas in the reading that need your attention and clarification. Your questions also highlight what needs underlining or notes you want to take. If you do not use self-questioning when you are reading what are you doing? Most students can recall reading page after page of text without any recollection of having read anything. Self-questions promote thinking while reading. It makes your reading interesting. If you have prepared for a lecture by reading with self-questions then you will listen to the lecture with these questions in mind. Using curiosity in the lecture will become your habit. When listening to classroom lectures the answers to your questions become the basis for your lecture notes. You can become the master of your learning by using questions. John, one of my students, who graduated with a 4.0 cumulative grade point average said, "It's the questions that do it."

A system of questioning

There are many ways to develop systems of questioning. I expect you will develop your own personal systems for different kinds of learning. I want to present a system which may be helpful in grasping the idea. As I have said, many students, who do not ask themselves questions, do not understand the definitions or terms needed to understand a course segment under study. Grammar is an example of a subject taught to too many students who do not comprehend or understand it. Yet, there are people who write all their lives without a feeling of competence as writers because they never clearly understood the vocabulary of grammar and this included myself, but at that time I never really understood how to learn either. I talked earlier about the students in the physics laboratory who did not understand the term "specific heat" even though they had been studying it in class for a week. They did not see the need for knowing the definition and they did not know that knowing it would be helpful to their learning. The system I am presenting should help you sharpen up such partly understood knowledge.

Learning becomes process when we use self-questioning rather than the segmental learning hurdles of memorization. Learning as process is a continuing development and evolvement of knowledge involving many changes. Learning process refers to the method you use to deal with learning which increases your knowledge and understanding. Francis Hunkins said, "Knowledge of process with the underlying knowledge of questions can exist at three levels: a knowing level, an understanding level and a doing level. The first level is an awareness of the process; the second level is the ability to verbalize the process; the last level connotes being able to employ the process."[3]

Let us see how you can apply this to learning definitions and terms, which are so important to learning any subject, yet tend to be ignored. Whether it is grammar, accounting, economics, mathematics, science or engineering the vocabulary of each discipline is important to its understanding and the application of its knowledge. Yet the most common thing I see among students is the neglect of the first two levels as they, with prodigious efforts, try to accomplish the doing level as they prepare for examinations and tests. Such an approach is inefficient and fraught with dangers to your academic success. Learning becomes easier when you work on all three levels of self-questioning. Hence, there are three sets of self-questions you should consider using to clarify and understand words and terms that need defining.

1. The knowing level. Questions to yourself. What is it? Can it be defined? (We become aware of the process.)

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[3] Francis P. Hunkins, Question Strategies and Techniques, Allyn Bacon, Inc., Boston, 1972, p12

2. The understanding level. Questions to yourself. Why is it? Where did it come from? What are its uses? What is its meaning to me? Do I understand all the words and what they connote? Can I say it in my own words so I understand. (We develop the ability to verbalize the process.)

3. Doing level. Question to yourself. Can I apply what I have learned. (We develop the ability to employ the process.)

I have heard many students say, "I can't explain it but I can show you how to do it." I am sure you have heard that. Students who talk this way are not understanders but memorizers. They memorize process without the ability to verbalize it which means if you can't say it you don't know it. This system of self-questioning can bring understanding and mastery to your learning. If you ask yourselves more questions and get the answers you learn more. I highly recommend you try this system of self-questioning. Once you really understand the vocabulary of words and terms used in any subject, understanding and mastery become easier.

Sequential Learning and Questioning

Sequential teaching is an important concept in teaching. It relates to subject material that builds on its knowledge. The course material for such subjects needs to be ordered from the simple to the complex in a hierarchy. To learn these subjects you need to understand prior material in order to learn new materials. All college subjects are sequential to different degrees. Mathematics, the sciences, history and engineering courses are examples of highly sequential courses. For example algebra is sequential in itself, yet it is also necessary in learning trigonometry and both these subjects are needed to learn the calculus. Most students who have difficulty with the calculus did not understand algebra and trigonometry. It is nearly impossible to understand courses that are sequential in nature without self-questions which are necessary for discovering the linkage between the courses and course material that brings about understanding. Too many students depend on memory, not understanding through the use of questions. Many of these students flunk out of college, many others who are more gifted with memory do graduate. One Ivy League student who graduated cum laude said, "I work hours and hours preparing for my exams and after they're over I forget all I learned." I have also learned that many top student in our colleges do accomplish their learning through self-questioning. They probably come by it naturally or because some excellent teacher or parent imbued them with the talent. Students in my classes were told to experiment in their other classes with learning through self-questioning. I did not always succeed since you cannot force students into this kind of learning which is self-motivated. In two examples of success let Tania and Brian tell us about their experience with sequential learning in their classes.

> Tania, "This course showed me that questions (those that led somewhere and had definite

> answers) do not indicate stupidity, but are to my advantage--without these questions, areas of knowledge would remain blanked and true understanding is not gained. I might be able to do process; but, if a new concept is presented in class a month later I would have to begin at square one and run to the teacher instead of recognizing the similarity by understanding and be able to do it, rather than saying, "Oh, no!, Not that again!"

> Brian, "The thing that has made me an efficient studier is asking myself questions and using my curiosity. I have a curious nature anyway so I decided to expand on it. I started asking questions and connecting ideas when I studied my text books. The result was incredible. If I wasn't so careless taking tests I would have an "A" in everything. I also remember the stuff I learned earlier in the semester without review. All this is because I know my stuff." (emphasis added)

Tania discovered that she gained understanding by her self-questioning about what needed to be known and she could recognize the concept at a later time and see its relevance to new knowledge she was acquiring. She was doing sequential learning. Brian found that using self-questions to connect ideas had developed his understanding.

He was doing sequential learning. A result he discovered when he was reviewing for finals, was that he remembered everything he learned throughout the semester.

To my knowledge this does not happen when memorization is the sole means of learning. Self-questioning is needed for sequential learning to develop understanding and increase your ability to remember what you learned. You will learn and understand more when you are aware of the linkage of knowledge by sequential learning. If you follow these suggestion with serious effort you will find your required study time will become much less than it was before. It saves time and your learning is more permanent. Brian came to see me two weeks before his first semester in the pre-freshman program ended with a request for an extra class in his second semester. What he said in his evaluation of my class reflects the reason, "When I first came here I talked to you about a seemingly impossible work load and what I could do about it. I really thought I was going to flunk out. The first month I did no partying and only got a few hours sleep a night. Last week I was in your office telling you I was bored. My studying takes no time at all now, and I have all kinds of leisure time. I've been reviewing for exams this week but I can't find anything that I am weak on, because I remember all the stuff from earlier. I feel the reason I remember it is because I used curiosity and questioning to relate new material to material I already knew."

About Hypotheses

Many people who may read this book will wonder about the use of hypothesis in learning. Is it useful? The hypothesis is another way of stating a question. The hypothesis is most useful in scientific research and is used to explore what is unknown. The hypothesis is a theory, an assumption or proposition that can be expressed as a probable statement of truth to be proved or disproved or as a doubt or a skepticism that needs verification. Such proof or verification is accomplished by scientific observations, tests or experiments. Since the material in the undergraduate level is already known and written in text books, hypotheses are of less value. When the hypothesis is needed in college learning it is taught, usually in a graduate school course. The art of using questions is taught as a college level course in philosophy, but does not necessarily apply and is not applied to school learning!!

Problem Solving

Students with a functioning curiosity approach problem solving with questions. In any problem's solution the problem's data has to be determined and verified for accuracy and relevance. Then a mathematical statement, i.e., an algebraic equation, is formulated from the data. This equation must make a sensible statement that says something when you decode it into words. Then each step of the solution must be a reasoned statement that develops the equation. You should be able to look at the solution to your problem and see a mathematical statement that makes sense and a consistent development of that statement and a final answer. To do this the student needs to formulate questions for understanding and analyzing the data before writing any equation. For an example look at the percentage problem in chapter 3 in the section on "premature closure." In this example the question, "What does the per cent relate to?" gets your thinking started in the right direction. Further discussion on problem solving will be found in chapter 6 where I shall give some concrete examples of problem solving as it applies to some algebraic solutions in mathematics and physics at the freshman and pre-freshman level in a two year college.

Asking the Right (Better) Questions

The ability to "ask the right question" was mentioned in an article on A Singular Man, about Stephen Hawking, a brilliant young British astrophysicist, (Quest magazine, April 1979). Its author John H Wilhelm writes, "Like Einstein, Hawking's achievements rely on his unique and stubborn instincts to ask the right questions, make the proper assumptions, then see all the way through the problem before it has been worked out." Hawking has lateral sclerosis (Lou Gerhig's disease) and is confined to a wheel chair without the use of his arms or legs. He does all his work mentally and dictates his results. This ability to formulate the right question and make proper assumptions is a special art many scientists would like to perfect. In this light I think our job is first to see if you can learn how to ask better questions.

Questions by their nature have a preceding condition that in effect presupposes a reason or cause for the question which in turn affects the answer. The presupposition to a question is a sentence that must be a true statement if the answer to the question is to be true. For example, I have asked hundreds of students, who have completed the segment on temperature and heat in their physics course, "What is specific heat?" I seldom get an answer that is useful to learning physics. Instead the students' answers ramble or are too general, naive and often incoherent. The result is the same no matter what their grades are. No real learning but lots of formula and problem memorizing. If the student had learned by questions and had asked himself, "What is specific heat?" and then considered the presupposition "Specific heat can be defined." or "Specific heat has a definition." The need to find a definition would mean that the answer would have to be specific. Definitions require clarity for understanding. The next question might be, "Where is specific heat used?" This is a poor question because the presupposition, "Specific heat has a location in which it is used," is false. Better questions are. "What is the purpose of specific heat? or How is it used?"

A student came to see me about some difficulty he was experiencing with freely falling body problems. "When a body was given and initial velocity, like shooting a bullet vertically downward from a gun, I do not know how to find the new acceleration." His presupposition was, "If a freely falling body is given an initial velocity downward the acceleration would increase." I asked him, "What caused the acceleration of a freely falling body?" He said, "gravity." Then I changed the presupposition. "If a freely falling body is given an initial velocity downward it changes the acceleration caused by gravity." With the proper presupposition to the question the student could see the error in his question and he then said, "That can't be true, if acceleration due to gravity is 9.8 meters per second per second."

Questions help you to discover, understand, systematize and remember the subject you are learning. They also help you relate and make connections between new and old learnings. The presupposition can help determine the validity of your questions. Becoming aware of the presuppositions to your questions can help you develop better questions for learning more efficiently.

Training and Habituation

Students who try to remember the step by step solutions to problems while taking tests or examinations usually do poorly on tests and many fail. "Oh yes, this it's like the problem in the book. Now, what was the first step?" or, "I remember, he did one like this on the blackboard. Now let me think, how did he do that?" This kind of thinking during tests or examinations is hazardous to the outcome. If there are problems on a test or examination you should be doing them, not figuring how to do them. A more responsible approach would involve doing some training and habituation.

Homework should be used as feedback to trouble shoot your understanding. Homework is also practice in the communication of knowledge learned in some written form, graphical form or by problem solution. Practice is necessary to train your mind to make the spontaneous neurological response in the proper sequence necessary for making a communication. Homework practice in problem solving, for instance, should continue until all variations of the problems under study are habituated and the step by step sequence of the problems' solutions is spontaneous. In other words, you need to practice all variations of the problems solutions until solving them becomes mundane, dull and lack challenge before you can consider you have sufficient habituation. In this way you do not waste time trying to recall steps in a problem solution during tests. Instead your time is used analyzing the data and solving the problem. Hence, homework is trouble shooting your mental neurological response until it will respond spontaneously to the process of problem solving. It is the same in communicating with good writing or graphics. Oh, you say that that takes a lot of time. Actually, when you build up your knowledge and skills less time is needed to do an increasing number of learning tasks.

There are learning tasks that do require memorization. Information can be trained into memory through repetition. Also a mnemonic device can be used to aid recall. Learning to spell is memory training which also uses mnemonics. "'I' before 'e' except after 'c' and when it sounds like 'a' as in neighbor and weigh", is a common mnemonic known by most of us. In mathematics the trigonometric function need to be memorized. The sine, cosine, tangent, etc., are names of ratios of two sides of the right triangle and the ratio and their names need to be memorized. Mnemonics for trigonometry are available or can be devised if a student feels he needs them. When reasoning or understanding are not useful, and memory is necessary to pass a test or examination mnemonics can be helpful.

SELF-CONFIDENCE THROUGH VALIDATION

The students with a functioning curiosity discover that self-confidence, as a learner, is not gained by passing tests and examinations. They come to the realization that one of the rewards of learning by self-questioning is that as they answer all the questions they can raise, they also validate what they have learned, "Now I understand.", or, "This stuff really makes sense to me.", and with this validation comes a real confidence in their abilities as learners. I have seen this confidence building happen for many students in mathematics, science, English and writing and other courses.

I said earlier, "You cannot trust the teacher with your learning -- you are the only one who knows whether you know or don't know." Therefore you cannot realistically depend on any teacher to tell you that you are right or wrong. You are the validator of your own learning. It is too great a risk to turn this job over to others because it assumes, a) that what you heard is what was said, b) that what was said was said correctly, c) that what you heard you understood, d) that what you remember is what you originally understood. Chapter 3, The Non-functioning Curiosity tells about these illusions students have about study and learning and what they think they know about their subjects. Everything that a student thinks he/she knows about a subject needs validation. When a student listens to a teacher or reads a text and gains an insight and leaves it at that, he/she is not validating. Validation is a self-confrontation that uses questions and their answers to verify learning. Only you know when you really understand what you are learning. VALIDATION IS NECESSARY TO BE AN AUTHENTIC LEARNER.

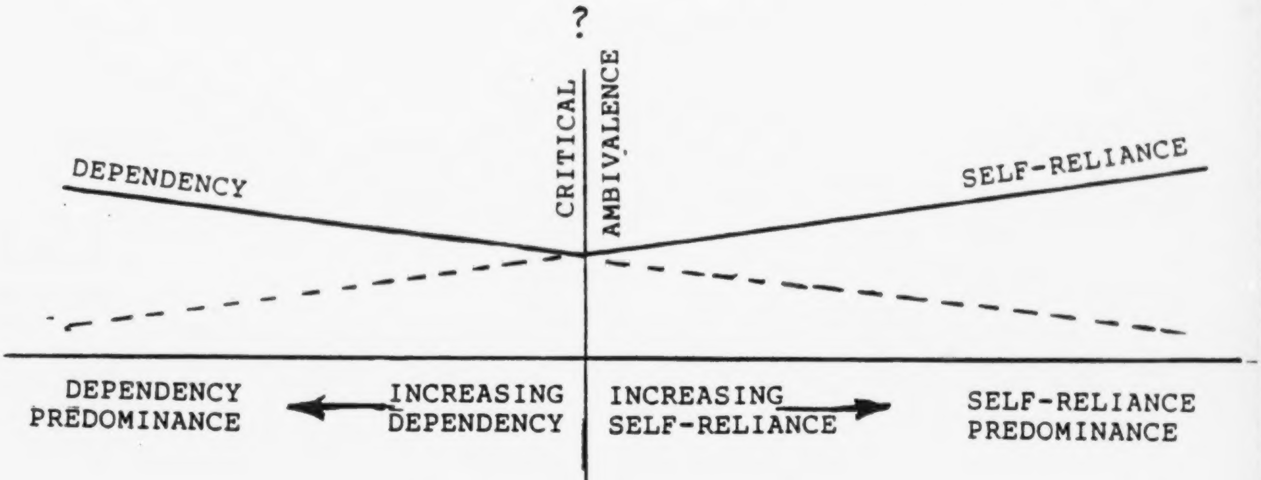
A mere feeling that we understand is not enough. When Dan, whom I talked about in chapter 3, came to see me because he could not understand why he flunked a math test when he "knew the stuff after the instructor explained it in class," thought he knew and understood and didn't need to do any homework. He took no action to verify his understanding or his mastery of what he had heard in class. Insight without any verifying action is not uncommon among students. All Dan had was a feeling that he knew. Another student speaking of his physics said, "It'll come." He also had the mistaken notion or feeling that physics could be learned without some action on his part. Henry was dismissed from the college and appealed his dismissal. He was asked by the appeals board why he never did any work in engineering drawing. "I already know that stuff. I don't need to do it." He felt grades need not be a measure of the student's performance. He felt that grades could be based on his say-so. The behavior of many students seems to indicate that action strategies are of little value in learning and that how they feel is more important. Such feelings are vaguely understood and may be mixed with feelings of dread about school work or a false sense of security. "It'll come," "I already know that," etc., are not usually based upon any validation but upon a desire to be passive or a need to impress. Such feelings make us vulnerable and need to be confronted. Without confrontation, to examine and test these feelings, there will be no significant learning and no meaningful change. Self-confrontation is the responsible action for validating your feelings about what you think you know. Without validation of your learning you may have a feeling of accomplishment but you will fail. INSIGHT REQUIRES AN AFFIRMING ACTION. Feelings alone or thoughts alone lead nowhere while giving some students feelings of progress while they scholastically decline and intellectually stagnate.

Validation is a result of understanding and systematizing your learning through self-questions. With validation you know you are an authentic learner.

THE CONTINUUM

In Chapter 3, I have described and explained the four motivational needs and their family of behaviors which constitute the learning dependencies of a non-functioning curiosity. It is important for you to know that these behaviors are part of a continuum whose extremes are dependency and self-reliance. Webster's New World Dictionary, second college edition, defines a continuum as "A continuous whole, quantity or series; a thing whose parts cannot be separated or separately discerned." Our continuum is a mixture of self-reliance and dependency. The left end has dependency in predominance, the right end has self-reliance in predominance. (See figure 2) Since we are all a mixture of dependency and self-reliance we all have our place on the continuum, some of us are more dependent, some are more self-reliant and some are in the middle. The beauty and the hope lies in our capacity to change our place on the continuum as we grow in knowledge and wisdom and become more self-reliant. Some people seem to stop growing when their bodies stop growing, while others stop when their schooling stops, others never stop growing. It is my conviction that life's purposes include continual growth and development in our abilities to think and to perform.

In figure 2 movement to the left reflects a loss of power and increasing dependency. The four dependency needs in figure 1 are interdependent and tend to feed one another. For instance, if you


?
CRITICAL
AMBIVALENCE
DEPENDENCY
SELF-RELIANCE
DEPENDENCY PREDOMINANCE
INCREASING DEPENDENCY
INCREASING SELF-RELIANCE
SELF-RELIANCE PREDOMINANCE

THE NON-FUNCTIONING CURIOSITY	THE FUNCTIONING CURIOSITY
THE NEED FOR AUTHORITY AND OBEDIENCE	THE ACCEPTANCE OF UNCERTAINTY
THE NEED TO HOLD OTHERS RESPONSIBLE FOR US	THE ACCEPTANCE OF VULNERABILITY
THE NEED FOR ABORTIVE ACTION	RESPONSIBLE ACTION
THE NEED FOR ASSURANCE	SELF-CONFIDENCE

THE DEPENDENCY, SELF-RELIANCE CONTINUUM

FIGURE 2

have "the need for authority and obedience" you may find that the authorities don't always give you what you think you need. Then you may find "the need to hold others responsible for you"; namely, your authorities, the teachers. You may then find "the need for an abortive action" if you "can't work for a teacher like that" and/or "the need for assurance" from the dean or advisor that you're in the right. When this occurs you have a dependency syndrome. In other words, when these dependency needs act together we have a syndrome. The syndrome promotes a dependency predominance but any improvement (decrease in needs) in one results in an improvement in the other three.

A movement to the right reflects an increased growth in self-reliance which comes with increasing self-confidence and an increasing ability to be in charge of your own learning. The students with a functioning curiosity have a need to learn by resolving uncertainties and this involves facing up to their vulnerabilities. These decisions require the development of responsible action strategies for learning. The result of such actions is a decrease in dependency and growth in confidence and self-reliance. This results in changing one's positions on the continuum toward self-reliance. This movement to the right brings the student to the point of critical ambivalence. (see figure 2) At this point some students may feel insecure about relinquishing dependency on the authorities that direct them. Beyond this point self-reliance has predominance and you begin to be on your own as student and learner. "Past authority" students may hesitate about leaving an environment that has dependency predominance where they feel secure and they believe they can get the desired grades. On the other hand students who found self-reliance an exciting and rewarding experience moved through the "point of critical ambivalence" without thinking about it or knowing it happened. The experience of having their self-confidence soar as they learn with understanding reinforced their feelings of self reliance.

SUMMARY

The main theme of this chapter on the Functioning Curiosity has been one of responsible action in learning through a system of self-questions. This involves asking questions of ourselves about the things we want to learn and need to learn. Every topic we discussed in this chapter has been about action. Dealing with uncertainties, dealing with our vulnerabilities involved in learning, taking responsible actions in learning and the building of self-confidence through validation are all actions that can make us self-empowered and self-reliant learners. The means of discovering these characteristics was finding a dynamic continuum that would show the possibility of a change from a non-functioning curiosity of dependency to a functioning curiosity and self-reliance. These four characteristic are the substance of the chapter.

Accepting and dealing with uncertainty is a must if you want to be an effective learner. Trying to evade it or eliminate it is to live with a dangerous illusion fraught with worry and possible failure. Any endeavor to eliminate uncertainty is an endeavor to stop change. Such endeavors by their nature, narrow perception and decrease learning. Accepting and dealing with uncertainty requires only one authority-- yourself. Accepting uncertainties and resolving them is learning. The student with a functioning curiosity knows that curiosity requires a question in order to function hence, he/she resolves the uncertainties of learning by posing relevant questions to one's self and then getting the answers. Developing the art, the ability and the resiliency to deal with uncertainty is an important step toward self-empowerment as a self-reliant learner.

To accept uncertainty in learning is to be confronted with our vulnerabilities. Moving toward these vulnerabilities, checking them out and overcoming them is an important part of self-empowerment. Such confrontation requires asking ourselves questions. What are the things that keep me from being a good student? What are my habits, my attitudes, my fears that keep me from learning? Introspection of this kind needs to be followed by action if you are to move toward self reliant learning and away from dependency.

In order to fully resolve these first two issues we needed to develop systems and strategies for responsible actions. We discovered that questions are tools for self-confrontation which motivate action for learning. David Hackett Fischer revealed to us that questions stimulate the intellect and develop our ability to think about what we are studying and learning. This ability also helps us to understand what we learn. Hunkins's three levels of questioning gave insight into a system of questioning which empowered our ability to understand and to systematize what we have learned. This system of questioning helped establish linkages with things learned, thus increasing our understanding through sequential learning. We also found we could improve the question we ask ourselves when we pay attention to the presupposition of our question. Another responsible action is the training and habituation of our neurology to increase our efficiency in dealing with the steps in problem solving and in other areas where routine, if not habituated, can interfere with necessary thinking. I will deal at some length with problem solving in the last chapter.

The reward for perfecting the art of using self-questions for learning is a growing sense of validation that comes with understanding what you are learning. Your learning makes sense and you know you understand the knowledge and can use it. You know you are authentic as a learner. This is the reward of knowing and acting on the fact that you are the only person you can rely upon to validate your own learning.

CHAPTER 5

AWARENESS AND LEARNING

The "Tuned In" Student

Awareness empowers you as a learner.[1] In learning, awareness is about concentration. It is about how the mind pays attention to all things relating to doing its tasks. It is about knowing what your organism (your body with its mind) is up to, i.e., doing or not doing. This chapter will concentrate on how to develop high awareness for learning. Four ideas will be defined and discussed, awareness, focus and diffusion, spontaneous concentration, and introspection.

Being aware of any kind of learning environment was low to non-existing among many students I worked with. Some students appear to be "under orders" from their teachers or professors to perform tasks. Doing these tasks well is viewed, by these students, as getting a college education. "Aren't you supposed to do what the teacher tells you to do?", is their query. I reply, "It's more complex than that. You leave yourself out. What do you want, as one of the parties in your learning contract? Isn't it your education you're after and not merely performing tasks for teachers?" Other students appear unaware because they seem not to know what to do in the learning environment. (I know about this not only because I observed it but because it was my own experience as a college freshman.) We wander about the college in a daze, lost and worried as if in a foreign land without the foggiest notion about how to work productively in a classroom, laboratory or while studying. Teaching about motivation needs a classroom atmosphere that helps the pre-freshman students feel safe enough to participate in discussions. It was not easy to do this because past school and home experiences taught too many of them that it was not wise or safe to recite or speak out in the classroom. As a result not many students knew how to function effectively in a classroom or in the college. All these things make students vulnerable and effect their awareness.

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[1] Basic concept of awareness, for this chapter, has been adapted from Gestalt Therapy.

When I started teaching this segment on awareness I asked the students, "What is awareness?" The students usually answered, "Awareness is knowing what is going on around you." This definition is commonly held by many people. This is not the meaning of awareness I will use. A dictionary definition might read like this, "Awareness is a word used in psychology to mean the state of being aware of information, we gain from our environment, by being alert to what we see, hear, feel, taste and smell." This is a good definition, yet, its applications to learning in school has not been obvious. I will develop the meaning for awareness as we proceed with this chapter. First some specific illustrations of low levels of awareness in learning.

Students who have low levels of awareness are inattentive in the classroom and during their study hours. Harriet always came into my classroom in a talkative mood until the class started, then she would sit in the semicircle of tablet armchairs, in what appeared to be an attentive posture and hold it for twenty minutes or more then change her position and continue to look attentive. She was never able to answer questions I put to her. I suspect sometime in her school life she learned this posturing was safe classroom behavior for her while she apparently daydreamed. Josh had a more common kind of behavior. He would come into the class thirty seconds ahead of time and find a chair, lay his coat across it, then find another chair and lay his body across it. He would then enter into a semisomnolent state and with his arms folded stare into space at times shifting his position to be more comfortable. At the end of the period when others were leaving he would pick up his body then his coat from their respective chairs and leave. I have had students who liked to sit next to a window so they can watch the activities out on the campus. Daydreamers offer the excuse that the teacher or the subject is boring. To unaware students these distracting lures are abundant, such as activities outside the windows of their classroom or their study area, noises inside their classroom or chalk dust on their professor's clothes attract much more of their attention than the lecturing efforts of their professor. The students participating in these behaviors are unaware that they are not making any meaningful contact with the learning environment in the college. When they are questioned about being inattentive they remark, "Oh, I'm listening.", or, "I know what's going on." Yet further questioning reveals that they were not listening and they did not know what was going on. This lack of awareness of what good school behavior is about is not understood by most students. There is no meaningful interaction between their environment. There is a lack of awareness.

DELIBERATE AND SPONTANEOUS BEHAVIOR

Deliberate and spontaneous behavior needs understanding for our discussion of awareness, because awareness originates from our spontaneous self. Deliberate behaviors are conscious actions you do on purpose. When you open a door, ride a bike, run, walk, do your homework, play ball or dance you are involved in deliberate behavior. It is also deliberate behavior when you see and you hear. Usually a person takes the responsibility for his or her deliberate action, done on purpose. Spontaneous behavior, on the other hand, is an unconscious act you may be unaware of. Although I just said opening a door, riding a bike, running, walking, playing ball and dancing were deliberate behaviors, there is much about these actions that are spontaneous. We may deliberately think about opening a door but we don't think about how to do it. The same is true of riding a bike, driving a car , dancing etc., the "how to do it" become programmed into our unconscious mind by practice and repetition until they become spontaneous behaviors. Other kinds of spontaneous behaviors are related to gravity and solidity. One example; when you sit in a chair you unconsciously expect the solidity of the chair will protect you from the pull of gravity. If the chair is in a weakened condition or someone is borrowing the chair at the moment you are sitting down you will have reason to become conscious of, and pay attention to, your spontaneous behavior the next time you sit down at that party. We don't knowingly walk into walls or fall down stairs, such precautions are programmed into our spontaneous self.

What we shall be most interested in is how seeing and hearing relate to our spontaneous behaviors of fear and survival. We must pay particular attention to this in learning because you may deliberately listen and observe and spontaneously stop seeing and hearing with total unawareness while in an educational setting just as you may have done while driving a car as a commuter. Much of this school behavior can be defensive reactions hidden behind feelings and emotions you developed about schools and teachers as a protection from what, at one time, was an unpleasant or traumatic experience. Whatever protection they provide it is at great expense by providing a false and erroneous perception of your life at college.

AWARENESS--WHAT IT IS AND WHAT IT DOES

What is awareness? Awareness is the result of a spontaneous sensing of what arises in you--of what you are doing and thinking. This spontaneous sensing is a human mechanism operated by your feelings. I call this human mechanism of feelings a sensing valve because it intuitively or emotionally senses your inner feelings about what you are doing and thinking. The result is that it spontaneously opens or closes you to further experiencing. Your own inner feelings and emotions spontaneously control the sensing valve. Positive and safe kinds of feelings intuitively opens you to similar experiences in the future. Negative and threatening experiences may result in an emotional self-protective action of fear, revulsion, trepidation, etc., can close you out from similar experiences in the future. Table 1, shows a number of contrasting feelings and emotions which may spontaneously open or close your sensing valve, thus opening you up to experiencing or closing you down from experiencing. It is possible for you to intuitively know when your feelings are closing this sensing valve and it is then possible to exercise some control over it. Although your spontaneous behavior influences your awareness you can have power over it.

Learning is accomplished by using your senses to collect information from your environment. Tasting, touching and smelling are intact for most all people and successfully deliver the messages they receive. It is seeing and hearing that can become distant. By this I mean, there are times when you can't or don't see and hear many things. This causes you problems when you should be hearing and seeing and actively registering information. "I didn't hear him say that." "No one said anything to me." "I didn't see it." "I passed the bulletin board ten times and I didn't see it." and so on. Because hearing and seeing can become distant, it is important to know what your sensing valve is up to. Hence, to more successfully manage your life as a learner you can increase your awareness by paying attention to your spontaneous self and discover the difference in the feelings between your spontaneous and deliberate behaviors. Become aware of the feeling of your sensing valve when it is opened or closed. Your job is to keep it open. With your sensing valve open you become aware of what you spontaneously blocked. With the sensing valve open you will learn to cope with the negative emotions in your life just as you do with your positive feelings. In this way you become increasingly aware of what your total organism is doing, in the classroom, laboratory or in study and in your life as you obtain your education. You will become aware of what you need to be seeing and hearing and know what you are doing or not doing about your learning, and you can do something about it. You can also do something about your boredom and deal with that and other things you feel you don't like about learning in college. In time you will find that boredom will become excitement and your dislikes will change for the better. You will feel a sense of empowerment as you take a more objective control of your life. Andy said, "Increasing awareness is knowing what you're doing and doing something about it."

THE SENSING VALVE

Positive Emotions and Feeling valve opens	Negative Emotions and Feelings valve closes
interesting	dull
pleasant	unpleasant
comfortable	painful
pretty	plain
beautiful	ugly
exciting	boring
happiness	fear
etc.	etc.

TABLE 1

At the end of each semester I have held a series of interviews with each student in my classes in motivation. Jeremy told me he did not like my class because I had cut him off in a class discussion. I remembered the discussion because his persistence caused the discussion to deteriorate into a stand off between he and myself which was not involving the class. I ended it by asking him to come and talk to me at a later time. Jeremy considered this as a bad experience and his sensing valve closed me out for the balance of the semester. He needed to become more resilient and learn to cope and resolve the problem. Instead he kept closed until we had our interview. Many students have, at times, blocked out a teacher in a major course causing themselves a destructive result because their emotions prevented them from coping with the teacher or the situation.

Granted, some teachers can be difficult and unfair but if you keep yourself open to your environment you can find ways to cope if you do your own learning, i,e., not being teacher dependent. Brian found one of his teachers difficult because of his rigidity and autocratic manner. He did not dump the course or fail it but settled for a "B" in the course. For Brian it was a tarnished mark on his grade point average that would have been a 4.00 at graduation. But then grades aren't everything. He made a compromising decision and coped successfully.

The first chapter has many examples that decrease awareness and make learning difficult. It is necessary to learn how to cope. Worry closes many sensing valves and freezes them closed. The section, in chapter 1, on "BIG QUESTIONS" gives some examples of questions that keep the sensing valve closed as long as you ask the wrong persons. The section on "Boredom" talked about in chapter 2 is another example of the loss of awareness because your spontaneous behavior closed you off from coping. Fear or dislike of change can also result in your spontaneous sensing closing you out from experiencing. It appears evident, like it or not, that you are responsible for your spontaneous behavior, just as you are responsible for your deliberate behavior. And that's a fact. You can deny it, avoid it, and you can ignore your spontaneous sensing and accept whatever feelings or emotions, you have, as who you are. What then? You have closed out much of your environment as prohibited. Why? Because parts of your environment became fearful, hostile ugly, etc., and not to be dealt with. Two conditions are now possible for you. a) To perpetuate the undesirable aspects of your own life that you complain about. b) You become dependent because you do not reach into your environment to get what you need to improve your life. Since life must go on, others in your environment will attack you, "When are you going to get this done!", "Do your homework!", etc. Your story is, "What do you want me to do?", or "Show me how to do it?" and ultimately, "Give me what I need and make me do what I am supposed to do." I am sure you can paint more of this picture yourself. Until you become aware of your spontaneous behavior, and accept responsibility for it, you can lose awareness and a lot of learning.

Another interesting fact is the obvious change that occurs between you and your learning environment with your increasing awareness. Your college environment becomes less threatening. You and your environment become partners in the discovery and learning in the library, laboratory and classroom, in the professor's office, in study and in the whole environment of college or university.

SPONTANEOUS CONCENTRATION --FOCUS

Spontaneous concentration has been experienced by most people. It happens when you are totally absorbed in what you are doing. You may recall reading a book or doing some project that so absorbed your attention that you were "dead to the world." In such a condition it is difficult for others to get your attention. Spontaneous concentration seemingly happens without effort. When it occurs, what you are doing is in clear focus. It is then that you have full and complete awareness and you and your environment are working as a single unit. There is no closing of your sensing valve. You are eagerly opened to your experience of the moment. How does this spontaneity happen?

Questions provide a person, with a functioning curiosity, with a tool for centering attention. I have found that students who ask themselves self-questions have found the means for centering their attention, acquiring focus, creating interest and the condition for spontaneous concentration to occur. Ideally this should be what happens in learning. If spontaneous concentration means being absorbed in what you are doing to the exclusion of everything else, the method to use is the same in college as it is outside the college. That method is ask yourself self-questions about the things you want to know and learn and carry this inquiry to its conclusions. Yes, you can invite your college environment into the world of your awareness.

It is important to mention here that knowing what is going on around you is not awareness but a diffusion of attention. It is impossible to be fully aware of more than you can focus your attention on. Anything else is either a distraction or a comfortable condition of relaxation when you hear and see many things but you are not fully aware or paying attention to anything.

How many times have you read many pages, because you were supposed to read them, and then not remember reading anything on those pages. How many times have you pondered and gazed at the data of a problem (math, physics, economics or whatever), struggled with it and accomplished nothing. Then swear to yourself or before the teacher or parent that you are going to "work harder", and really "hit the books." This calling up of your will power to transcend the resistance of the body to learning usually ends up in just spending more time doing the same old thing in the same old ways. It is by using your own self-questions that you become involved with your own learning, become centered, create interest and bring about spontaneous concentration.

EXAMINING LIFE AS A STUDENT

The final task of this chapter is to show how to further increase awareness in learning by examining your life through introspection, ie., self examining. It is possible to effect change in your awareness by reshaping your spontaneous behavior in positive ways. The pattern of some of your learning may have been determined by a spontaneous behavior from a long time ago.

Socrates, speaking in his own defense before the Athenian Senate said, "...I say again that daily to discourse about virtue, and of those other things about which you hear me examining myself and others, is the greatest good of man, and that the unexamined life is not worth living."[2] Since Plato wrote these words 2300 years ago this quotation has had different meanings for different people depending on how they viewed "the unexamined life" or, for that matter, the examined life. My concern is examining life as a student.

[2] Plato, The Apology, (38)

Can examining your life as a student make it more worth living? There are as many answers to this question as there are students since their aspirations vary in regard to life in college and life after college. If there is one goal to guide the student in examining life it is, "Am I learning how to think so I understand my goals, my biases and learn to trust my own feelings?" Ultimately, "Can I develop my thinking to be objective and intuitive?"

You can increase your awareness by using introspection. Introspection is a deliberate act of turning your attention to look within yourself to evaluate, correct and control your spontaneous behavior in an interfering way. It is a self-initiated effort to effect an inward change. Lasting change can result from the reconstruction of a spontaneous behavior. Some of your habits and attitudes that defeat good learning have been with you a long time. A result of early fears and trepidations, they have conditioned your spontaneous behavior and decreased awareness by closing your inner sensing valve to the experience of self-confrontation and coping. By deliberately paying attention to these spontaneous behaviors, with introspection, we change them. Merely paying attention to them takes them out of the realm of spontaneity, ie., the realm of spontaneous sensing. New behaviors can now happen. For instance, you feel, "Gosh, This stuff is boring!" You have felt this for some time. You introspect, "Why is it I am so easily bored?" This question gives you a sense of being incomplete and you want to feel whole. Almost without effort you find a focus. The diffusion of incompleteness disappears as you focus on your boredom that needs attention and a solution. You find the reason for your boredom lies in how little work and attention you have given to the courses. In your struggle for completeness you do something about your work and attention. In addition you may seek out the Learning Center in the college and you begin a program with them. You begin to feel a new wholeness as you contact your environment in new ways. Your awareness increases as your spontaneous self acquires positive ways to respond to the environment.

Checking the Kid Out

In examining life as a student there are many spontaneous behaviors you might find valuable to consider, such as, what you might say about your old learning. I have heard the statements many times from pre-freshman, freshman and other students that indicate a closed sensing valve. Let's consider some of these with an approach that may help you recognize a closed sensing valve. First, is the statement I am sure will sound familiar, "I was never any good at ....!" Here are a few examples.

> I never was any good at math!
> I was never able to do science!
> I was never any good at English!
> I never was any good in history!
> I was never any good at school!

These statements translate to, "I can't do it" or "I can't learn it." The feelings behind these statements cause your sensing valve to close at the mention of the math, physics English, history or school. It is these feelings you need to examine. For instance, "I was never any good at math."

Question

"How old were you when you first discovered you were not good at math and what grade were you in?

Answer

"I was in the sixth grade when I learned I was not good at mathematics. I was about 12.

Question

Is the twelve year old kid, inside you, telling you that you are no good at math? Is it his voice you hear?

Answer

Yes, may be, probably is. I never thought of it in that way.

Question

Why don't you check the kid out? Now that you're a college student research your own abilities. Find out what you can do. Don't let the twelve year old sixth grade kid rank you. Make a fresh start and find out how much and how well you can learn.

Many students have found this helpful because they discover abilities that they did not know they had. Connie found out she could do physics. So did George. Larry said, "I checked the kid out. I am amazed at what I can do." Darryl's self-confrontation changed his whole life as his self-confidence soared. Practice being objective about what you feel and think. There are many fears, feelings and misinformation that may defeat you if you don't examine your life as a student. It is a part of learning to think. Chapters one through three are filled with questions that need to be asked and examined in your quest for an increased awareness.

Other ways to check the kid out might be to see how many uses you may have for the "Yes, but", the "If only" and the "What if". The "yes but" is a "nobody can help me" game of avoidance. Here you show you want help but you are afraid to accept it. For instance, student, "I can't seem to pass any math test." Counselor, "Have you considered seeing your teacher about help?" Student, "Yes, but he doesn't want to help me." Counselor, "Have you considered seeing another teacher?" Student, "Yes, but they only confuse me." etc. This inner spontaneous reaction needs to be confronted and examined. Do I really want to be helped, and do I really have the courage to change?

The "if only" makes you feel helpless because you messed up in the past. "If only I had studied harder in high school." "If only I started my term paper earlier." The, "What if" fears the future. "What if I fail." "What if I can't do it." "What if I don't pass." Examining these things with the aid of a wise counselor, teacher or friend can be of invaluable assistance to reshape your spontaneous behavior and thus increase awareness.

Regarding introspection you must have a good reason to use it, and when using introspection always be objective in your thinking. Over pre-occupation with introspection is usually subjective and can be pathological. For example, You should not feel that something must always be wrong with you that needs fixing.[3]

SUMMARY

Awareness and learning are closely linked. Increasing awareness empowers your learning. Increasing awareness heightens your attention to your task. With high Awareness you know what your organism is or is not up to while you are learning. With a high level awareness you know you are in charge of your learning. Knowing and using awareness in learning requires that you understand the difference in the feelings between deliberate and spontaneous behavior, that you understand that awareness results from your spontaneous inner sensing and that full awareness is "focus", which is also "spontaneous concentration."

To gain control of your awareness, learn to know what is your spontaneous behavior because awareness results from the spontaneous sensing of what arises in you in regard to what you're thinking and doing. To do this you need to learn the difference between the feelings of your deliberate and spontaneous behaviors. This kind of discrimination will do much to help you discover how aware you are of your environment and experience. If you look at your spontaneous sensing as an inner "sensing valve" that opens you to experiences that are pleasant, exciting, stimulating, etc., and closes against the unpleasant, dull, boring, fearful, traumatic or any other disturbing experiences it may help you to feel the difference between your spontaneous and deliberate behaviors. Striving to keep the valve open to experiences increases your awareness and increases your ability to cope and manage more of your life in and out of college as you learn to handle a wider range of life experience.

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[3] For reference see, James, M. and Jongeward, D., Born to Win, Addison Wesley Pub. Co., Reading Ma., 1971, Ch. 1

When you experience spontaneous concentration, the use of self-questions centers your attention on your work, then as your mind focuses on what you are doing, the diffusion of inattention spontaneously disappears. This is spontaneous concentration. Any decrease of attention brings with it the diffusion which comes with mental fatigue or relaxation. In times of physical and mental relaxation you can choose your own level of awareness to suit your needs.

Increasing awareness is an opportunity to examine one's life. Too many students graduate from college with too little learning. The fault lies not in the teaching but in the student's low awareness of his or her learning techniques and commitment to real learning It is a good idea to examine your life as a student to increase your awareness about yourself and make course corrections as you move toward your goal. "The unexamined life is not worth living."

Low awareness tends to isolate your "will." When this happens, pledges or promises to "work harder" do not get results, concentration is impossible and concentration is something you feel you must force yourself into by calling upon your "will power" as if it were a special power you call on to overcome your limitations. Such prodigious efforts are not part of the thinking of a person with high awareness. With your spontaneous inner sensing properly directed, your concentration will be spontaneous. It is there when you need it.

The next and last chapter will illustrate how a person with a functioning curiosity might work in learning different subjects. How to use questions to learn English grammar, how to learn mathematics, science, history and how to use questions to do word problems.

CHAPTER 6

LEARNING WITH A FUNCTIONING CURIOSITY

"I Know My STUFF!"

The only way to take advantage of this book is to try out the ideas and then practice them on whatever you are studying at present. You cannot make a judgment about this book until you do. To do so would be to make a premature closure. Previous chapters do not have many illustrations and examples. The purpose of this chapter is to give some elementary examples that would be understandable to the unsophisticated beginning students in college. I will give some examples of learning with a functioning curiosity in English, mathematics, problem solving, science and history. I will also talk about laboratory experiments and their write-ups and the use of questions in writing essays and other papers. I will continue to contrast students with a non-functioning curiosity with students with a functioning curiosity. I cannot possibly explain or show you how a student with a functioning curiosity would learn an entire course so I shall limit myself to a few simple examples not discussed heretofore. Let's begin by discussing some fundamental concepts so they will be in focus as I proceed with this chapter.

You remember the section about "BIG QUESTIONS" I talked about in the first chapter. The examples given were:

a. What do I have to take this course for?

b. What can anybody learn from a course like this?

c. Why do I have to learn factoring? What good is it?

d. I'm going to be a technician so why do I need to study English anyway?

The presuppositions to these BIG QUESTIONS are varied. For example: a) The teacher knows the answer to my question. b) The teacher doesn't know the answer to my question and I'll catch her. c) I don't have to learn this stuff and he can't make me. With a little thought you can see the disagreement between these statements and any of the above questions.

When you asked the right person these questions the presupposition may be like this, "There is a good reason why I came to college and why I am enrolled in the courses I am in and I must get this clarified for myself if I am going to make any sense out of getting an education." This presupposition has agreement with the BIG QUESTIONS and spells out a task of self-examination. The BIG QUESTIONS, are the questions you, the asker, must answer, or they will become part of your vulnerability. Obtaining the answer requires self-confrontation. Once the BIG QUESTIONS are answered they lead to numerous other question you will ask yourself in your quest for learning.

Let's review "questions" in relation to responsible actions in learning. It all begins when the student accepts the uncertainties of his learning as his responsibility, challenge and motivator with all its accompanying feelings of vulnerability and he faces the responsibilities of his learning rather than procrastinating or making excuses. He/she becomes aware that: A) Responsible action is a most important motivator and that, by organizing their learning around self-questions they are telling themselves WHAT THEIR JOB IS as a learner in college. B) The students with the functioning curiosities know the use of questions in learning does not mean using other people's questions, found at the end of chapters, questions by teachers in class or questions on a test. These students would consider such questions as not their questions. C) To them learning is based on the art of self-questioning, which is that "curiosity of inquiry" Einstein spoke of. They devise their own questions from their textbooks, lectures and laboratory manual of experiments. The act of finding and getting answers centers their attention and leads toward a spontaneous concentration. D) As they gain understanding they systematize their learning into a comprehensive whole for effective communication. They know that using other peoples questions does not result in comprehensive learning. They usually find that a thorough job of researching and validation always results in their having the answer to such questions. E) The validation of their learning means they will know their stuff. I know I am repeating myself but the points I make are vital to real learning and they bear reiteration.

USING QUESTIONS FOR TEXTBOOK READING

Reading textbooks with self-questions gives purpose to your reading. It is a "make sense" reason for reading textbooks. It keeps you awake and alert while reading. Concentration is not a problem. Most importantly, questions will turn your energy into motion and your curiosity into controlled inquiry. "There can be no thinking without questioning," Let's look at some ideas that can help you get started reading with self-questions:

a. Ask yourself, "How is the textbook organized and how is each chapter organized in order to present the material in the book?" This question is important to sequential learning and to the systematization of your learning.
b. Change chapter headings and the section headings within the chapters into questions.
c. Skim to locate italicized words and bold face type to formulate questions that the author considers important.
d. Use the three levels of questioning, set out in chapter 4, to sophisticate your questioning. It is important to use the three levels of questioning to understand the definitions of words and terms that make up the vocabulary of the discipline you are learning, because questions generate thinking about what you are learning.

With your list of question you can turn your reading into a seeking and searching activity. Your reading centers on discovering answers to your questions. If you seek understanding in your reading, the book's organization may become evident to you. In using this approach in reading you will not find yourself reading page after page and not remembering you read them. You will, instead, find yourself raising further questions that increase your interest and understanding when you answer them.

Underlining or marking textbooks is often done meaninglessly. When I look at my college textbooks I see pages and paragraphs underlined. This was useless because of the excess underlining. I see many students following this practice. It is more useful to underline or mark the answer to your questions as you find them in your reading. Using this approach you will highlight the important and relevant points of the paragraphs. You will also recognize the main ideas in a paragraph as you read. The main idea of any paragraph is probably an answer to one of your question.

You can also use questions and their answers to form an outline or summary of each chapter. Professors use questions to test your learning. The more questions you have answered the less likely they can ask you a question not on your list. This method of outlining is meaningful and useful in a test or examination preparation.

The approach to take in using questions differ with the subject you are learning. Grammar, mathematics and the physical sciences that involve many definitions and much precision may vary in approach. The social science subjects such as economics, psychology, anthropology, history etc., may be approached differently. As you read this chapter you want to ask the question, "What is the approach for developing questions in this subject.

LEARNING ENGLISH GRAMMAR

I was taught English grammar in the eleventh grade in high school. I remember the course but very little of the grammar. Most adults I am acquainted with, appear to have little working knowledge of English grammar. This does not mean they cannot read or write, rather they do not have the knowledge, interest or the appreciation of syntax, i.e., in the grammatical construction of sentences. It is the lack of interest and appreciation that keeps us from learning grammar. Students who use self-questioning find it possible to learn and appreciate grammar.

Lois was having difficulty with grammar. We discussed how nature of grammar was involved with a lot of words and terms that needed to be defined and understood before she could use them in sentences. What is a noun, pronoun, substantive, antecedent, verb, adjective, adverb, infinitive, participle etc. I suggested she use self-questioning and self-validation to master the definitions sufficiently to use and recognize them, and then use the three levels of questioning to understand their applications in sentences. Lois was surprised how well she could do her own learning.

I believe, if your curiosity is functioning you can readily learn English grammar and syntax. By using the three levels of questioning to learn, you can activate your interest and curiosity to learn with understanding.

Eddy was having trouble passing a comprehension test. He came to me because he had taken the test about ten times without passing it. He wanted to know if I could "get him out of having to pass the test" so he could pass his Reading Improvement course. I suggested that he take the test again and this time change the title of the article, he was given, into a question and read the article to find the answer to the question. I also suggested he find as many other questions as he could while reading and find those answers also. In this way you can find out what the author wrote about. Then take the test. Eddy came to tell me he had passed the test with a high grade.

READING MATHEMATICS TEXT

In my experience with students from two technical colleges I find they usually view their mathematics textbook as a handbook of math problems from which teachers make study assignments. This also may be evident in high schools. When this is the case, learning is left to the classroom period and the notes that are culled from the teachers lectures. This can lead to emulating the board work of the professor when you are taking a exam, in an endeavor to remember the step by step development of his blackboard problems. When you do this during the test your thinking runs like this, "I remember this problem. The teacher did one like this on the board. Now, what was the first step? Damn, what WAS that first step? Gosh, how did that problem go anyway?" and so on. Can reading the mathematics textbooks make a difference? This is your opportunity to realistically find out what you can understand and do with mathematics. Check your "kid" out, put yourself to the test. Let us now look at reading mathematics as a strategy to gain understanding.

Reading on any topic in your mathematics textbook should precede its coverage in the classroom. This is important. It is good to prepare for the class lecture so you know and understand as much as possible about the topics before you listen to the lecture and the discussion in class. With this preparation you can listen more intelligently and with understanding. Reading with self-questions to answer will help you understand more and give you some intelligent questions you will want answered in class. In reading your mathematics textbook you will find yourself paying attention to the book's organization and the language of mathematics.

Because mathematics is sequential the organization of a textbook and its chapters are important. Its chapters are sequentially developed from the simple to the complex. When you perceive the sequential organization of a chapter you can begin to see approaches to learning the material. The student with a functioning curiosity systematizes his learning by taking leads from the textbook's organization. Using the book's organization can help alter any dependency habit that uses only the class instructor's lectures and your memory. Although it is possible to systematize your learning by listening to lectures, over time it is more difficult and is required only when your professor does not use or follow a textbook. It would be helpful to students if such professors distributed an outline of their course's content.

Mathematics textbooks have more illustrative examples of problems and their solutions than most other textbooks and as a result they do not have a lot of reading as in economics or history textbooks. Hence, you will need to learn the language of mathematics in order to read mathematical statements. This means developing the vocabulary of mathematics as you go. Algebraic expressions are used to communicate mathematics. Equations are algebraic expressions that make statements. Use your system of self-questions and answers to learn the definitions of the mathematical words and terms to build your vocabulary. You will also need to learn the symbols used to identify angles, constants and variables in mathematics. For example, the Greek letter pi for 3.14159+, $e=2.71828+$, < means greater than, > means less than, etc. In general the first few letters of the English alphabet are used to represent any constant, and the last few letter for variables. There are also special symbols to designate special operations such as limits, differentiation and integration. You develop the language as you learn. Hence, you need to ask the questions and get the answers to understand every definition. What are real numbers? What are their purpose? What are irrational numbers? ditto What is a factor? How is it used? What is factoring? What is its purpose and how is it used? What are powers, roots and radicals and how are they employed etc.? And on, and on.

Let us consider the "need to know" a workable definition of factoring. You can look up "factoring" in the index of your textbook to find the author's definitions. Because textbooks differ I will give three examples taken from different textbooks we shall call book (a), (b) and (c).

> Definition from book (a):
>
> "The key word in this chapter is factor. To factor means to separate a number into divisors. Factoring is the reverse of multiplication. The divisors 2,3,5,7,11...have no factors, except the number itself and 1, and are called primes. To factor completely means to separate a number into its prime factors."
>
> Definition from book (b):
>
> "Factoring is the inverse of obtaining a product. We

shall start with a given product and determine what quantities or factors were multiplied to give this product. We are interested in finding any monomial factors and any prime polynomial factors ie., polynomial factors which are divisible by no rational integral expression except themselves or 1."

Definition from book (c)

"Definition of factoring. We shall use the term factor to mean a rational integral factor.

"A rational integral expression is prime when it has no factor besides itself and unity.

"Finding the prime factors of a rational integral expression is called factoring the expression."

If we look at these three definitions for factoring, which defines it best for you? I think (c) is the best of them, but you do need to know the answer to the question, "What is a rational integral factor and a rational integral expression?" Definition (b) defines a factor as a "quantity that is one of the multiples of product." Definition (a) seems to prefer the phrase "to factor" in place of "factoring" despite using factoring in one sentence. This author talks of "separating a number into its divisors" instead of "finding the factors" or "determining the factors" of a rational integral expression. It is important to have a good working definition to help you understand what you are doing. Sometimes other textbooks can help you clarify a definition.

Students who have difficulty with factoring are not paying attention to the organization of the chapter on factoring and its sequential presentation. As a result they did not perceive the difference between the factoring problems. To them factoring was factoring. Freshman mathematics textbooks with algebra have up to seven kinds of special products and their factors. An examination of the textbook's chapter on factoring will reveal this. All chapters have similar development.

I have seen many students struggle with problems involving logarithms. They use memory and emulation while failing to ask themselves the important questions. What is a logarithm? What is the purpose of logarithms? How are they used and what are they used for? These important self-questions are significant and necessary to the learning of this segment of mathematics. It is also necessary to any further study of mathematics and the learning of science and engineering subjects. So, lets look at a definition of the logarithm.

The definition of a logarithm will tell you that logarithms are exponents and therefore have the same properties and laws governing their use. It will also tell you about exponential and logarithmic forms and how they are expressed in equations. "What are logarithms used for?", is also a part of the definition. Logarithms make it possible to solve equations where irrational numbers and/or variables are used as exponents. To completely define the logarithm and its laws and properties may take a page or more in the textbook. Once you have mastered the definition you can start solving problems with understanding.

The first step of self-validation begins when you perceive the connection between a definition, your understanding of it and its application. Self-validation occurs also when you perceive the linkage of ideas within a course or between courses. You begin to "know your stuff." There are textbooks that do not give all the definitions needed and some have poor definitions. The library should have other textbooks to help you find better definitions if you need them. There are a great many definitions to learn in any mathematics course and you should learn them and understand them. Once the definitions are understood you are prepared to study and learn mathematics.

The language of mathematics in the worked-out problems and examples found in textbooks are illustrations of algebraic statements showing one of three things: a) an example of a step by step development showing how algebraic multiplication, division, factoring, powers and roots etc., are done. b) a solution to many kinds of equations. c) a solution of literal equations or a formula derivation. You should have many question to ask about illustrative examples to understand them. It is important to ask the questions to discover why the examples are worked out the way they are. It is a waste of time to ask questions about why it isn't done another way before you find out why it is done the way it is done. For example:

> "What does the equation say?" Presupposition: Equation make a statement.
>
> "Why is the problem solved in the manner it is?" Presupposition: There is a logical development to all problem solutions.
>
> "What is the reasoning for each step in these examples or

sample solutions?" Presupposition: Each step of the problem is a reasoned and understandable development toward the solution.

USING SELF-QUESTIONS IN SOLVING WORD PROBLEM

Algebra word problems give beginning students, in the two-year colleges, difficulty. Too often the effort is memorizing the solutions to problems, as they appeared on the blackboard and in the textbook, with the hope that this activity will help them pass tests. As a result too much test time is spent trying to reproduce the problems substituting the test data. Time spent on this kind of activity is often time wasted. Memorization of a problem solution sacrifices the understanding needed to solve problems. This waste can be alleviated if you learn how to use questions to understand and analyze word problems so you can solve them logically, instead of trying to remember every step of a previously solved problem. I have already talked about the solution of a simple percentage problem in Chapter 3 in the section on "The Premature closure." You will see a lot of premature closure in the student's approach to the illustrative problems I will talk about. I will also show you, how using question can improve your thinking about word problems and how you can control and direct the problem solution, uncover inferred data, recall information necessary to the solution to the problem as you develop and organize your solution.

Illustrative Problem 1

In the diagram below the numbers 1 through 9 are shown in a three column three row matrix. Can you rearrange the numbers so that they will add to fifteen in all horizontal rows, all vertical columns and on both diagonals?

1 2 3

4 5 6

7 8 9

Take some time and see if you can do this problem.

For a long time I had much difficulty with this problem and did not solve it until I approached it with a functioning curiosity and used questions. Most of my students' immediate approach was to use the trial and error method which was my original approach. Lets solve it.

Assuming that the presupposition of the problem is correct, i.e., the problem is workable and has a solution. I asked myself two questions.

> What combinations of three numbers are there that add to fifteen using the numbers one through nine with no repeats? Does the matrix of numbers, as shown, reveal any such combinations of numbers? .LM9

I noted the three number combination passing through the five in the center added to fifteen. Hence, since there were four combinations using number five I inferred that five had to be the center number. I then asked. How many three number of combinations were there for each of the other numbers?

I started with the number nine and found only two combinations 9,4,2 and 9,5,1. This meant the nine had to be placed in the middle of one side and the 5 had to be in the center. I chose the middle column and put the 9 on the top, the 5 in the center and 1 on the bottom. The "4" and "2" were placed beside the 9 to head the left and right columns. So I set this up.

4 9 2 then I completed the diagonals 4 9 2
5 so that they would add to 5
1 fifteen. 8 1 6

Since the bottom row added to 15, to complete the solution I supplied the numbers for the two empty spaces so the middle row and the outside columns would add to fifteen.

the solution 4 9 2
3 5 7
8 1 6

In this problem a few questions and some insight brings a quick solution that some, including me, would take hours to solve by trial and error. It is interesting to note that all the three number combinations that add to fifteen from the numbers "1" through"9" are three for even numbers 2,4,6 and 8, and two for odd numbers 1,3,7 and 9, and four for 5. There are no other such combinations.

Illustrative Problem 2

A twelve quart cooling system has a 20 per cent solution of antifreeze. How many quarts must be drawn off and replaced with pure antifreeze to increase the solution to 35 percent antifreeze?

When I tallied my students' answers their most common answer was 1.8 gallons. This answer is incorrect. The number of students getting the correct answer was always small. Because many entering college students get this answer I feel there is value in talking about it.

This is the most common solution and the reasoning:

0.35 x 12 quarts = 4.2 quarts of antifreeze
0.2 x 12 quarts = 2.4 quarts before
4.2 - 2.4 = 1.8 quarts added (wrong answer)

The question we want to ask ourselves about these mathematical statements in this solution is: "What does each statement say?" Think about them. In this solution there is a premature closure that reveals that the solver did not understand the statement of the problem and as a result he did not solve this problem. What each statement in this solution says is this:

0.2 x 12 = 4.2 is the original quarts of antifreeze in the 12 quart cooling system.
0.35 x 12 is the antifreeze in a 12 quarts mixture with 35 per cent pure antifreeze.
The difference is the answer 4.2 - 2.4 = 1.8 quarts

The answer is wrong because:

This solution ignores the data that some antifreeze was drawn off before adding the pure antifreeze. (the premature closure) A premature closure occurs when you solve a problem using incomplete data. Particularly when the data is available.

This solution is for another problem that asks for the difference in the amount of antifreeze in two different 12 quart systems. One with 20 per cent antifreeze and the other with 35 per cent. (This lack thinking is the result of the premature closure.)

This solution does not use an equation, despite the fact the students had nine weeks of basic algebra including word problems and most had some algebra in high school. Hence,some students were still unsure about using algebra since so many of the solvers of this problem used arithmetic.)

This solution also shows how students do problems by emulation, ie., in a manner resembling other problems they have seen done before without any real thinking about the problem they are doing. Thus the student makes a premature closure and wrongly applies the data of the problem. This is a vulnerability that needs self-confrontation by many students

In algebra and calculus there are different kinds of word problems and the solutions differ for different kinds of problems. The first task is to determine the kind problem you are to solve.

Let us consider a proper approach to the solution our problem.

Question: What kind of a problem is it?

Answer: This is a mixture problem.

NOTE: There is a secret for writing the equations for all mixture problems. It works whether you are writing one equation or a system of equations. The secret is: For any mixture problem write the equations in terms of one ingredient in the mixture.

Question: What does the problem ask you to find?

Answer: The quarts of pure antifreeze to be added to the mixture.

Note : This is also the amount withdrawn before adding the antifreeze.

let "x" = quarts withdrawn or replaced

Then (12 - x) is the quarts of the solution after draining off "x" quarts of the solution.

"x" is also the quarts of pure antifreeze replaced.

12 quarts is the amount of the solution after antifreeze replacement.

Then: We will write an equation in terms of one ingredient, the antifreeze. It will say, "antifreeze plus antifreeze equals antifreeze." We write the equation so that it satisfies the data.

$0.2(12 - x)$ = quarts of antifreeze in solution after draining and before replacing

x = quarts of antifreeze replaced

0.35×12 = quarts antifreeze after replacing

The correct equation reads

$0.2(12 - x) + x = (.35)(12)$ Does this statement make sense?

$$2.4 - 0.2x + x = 4.2$$

$$0.8x = 1.8$$

$x = 2.25$ quarts of antifreeze added

Does the first equation, in this solution, make sense? Yes it does. It says quarts antifreeze in the system after withdrawing "x" quarts plus "x" quarts of pure antifreeze equals the quarts of antifreeze in the system when it is restored to 12 quart. This equation satisfies the data of the problem. The correct answer is 2.25 quarts.

In all word problems the initial equation written must say something that makes sense. In rate problems the formula, (rate) x (time) = distance, is used for analyzing data. The equations are written as sums of distances or sums of time. Distance + Distance = Distance or Time + Time = Time. In problems involving mixing different kinds of quantities of different prices the equations written would add up cost to equal total cost. The different kinds of problems are too numerous to illustrate. To do a proper job it would take a book in itself to illustrate the different types to be found in algebra, geometry and trigonometry or in basic physics or chemistry. Let us just emphasize that you need to ask questions about the data to organize it into a form useful to finding an approach to a problem solution. Here are some suggestions.

A. Order your work
    a. Tabulate the data or graph the data to:
        1. To make a clear analysis of the data.
        2. To help formulate your questions.
    b. Write an equation that makes sense.
    c. Make the solution a clear communication.
       Make you solution a neat and orderly presentation.

B. Questions to be asked in problem solving:
    a. What kind of problem is it?
    b. What are the data?
    c. What does the problem ask for? (find?)
    d. What do I need to know to solve the problem?
    e Is there a picture, diagram or graph I can draw to help me understand the problem and write an equation. Should I tabulate the data?
    f. Is the data complete or is there some inferred data that needs to be determined?
    g. Am I solving this problem? Am I relating the data to the problem and am I satisfying its objective?

h. What letters or symbols shall I assign for the variables or quantities to be determined?
i. Write an equation that makes sense.

This is not an exhaustive list of question needed to examine data in problem solving. As the problems use more advanced mathematics other questions will be added that involve such things as symmetry, limits, curve sketching, balance or equalities and finding the problem approaches which generate other data necessary for a solution. The examples given above illustrate the value to a self-questioning approach to problem solving. Any real success in problem solving comes with experience in expressing mathematical relationships in algebraic statements and using them in problem solving.

In mathematics use questions to learn definitions so you know all the mathematical terms. Use questions also to understand the laws of mathematics. Use questions to learn and understand all the varieties of problem solutions. Then practice, practice, practice to automate spontaneous recall.

READING SCIENCE TEXTBOOKS

I again emphasize the importance of vocabulary. This time, the emphasis is science vocabulary, that is the science you are learning. You need to learn the definitions of the scientific words and terms and understand their meaning if you want to learn science. Learning science also requires you to know and understand their laws and rules in order to properly apply them. For example Newton's laws for force, Boyle's' law and Charles' laws for gases and Kerchoff's laws for electrical circuits and there are rules for the mathematical operation of vectors, trigonometry etc. Many student try to memorize problem solutions without understanding any or with only meager understanding of the laws that the problem's solution illustrates.

Consider Chad's predicament which I discussed in chapter 3 on the "Premature Closure." Because Chad believed that he was "already motivated" to study hard in college he did not need my class to improve his motivation. As a result he prevented himself from learning how he could learn a workable understanding of Newton's Second Law which he was studying in physics at the time. He also did not discover that he could increase his ability to read physics. I talked to Chad 3 weeks after we had discussed the law in my class. I wanted to gain some understanding of his progress in learning. When I asked him for Newton's second law he couldn't state it. I asked him, what was the unbalanced force stated in the law? He did not know. So I said, "Let us look at the Newton's second law."

Many basic physics textbooks devote a full chapter to this law. The chapter heading "Newton's Second Law" suggests to the student looking for self-questions, such questions as, "What is Newton's second law?", "What does it mean?", "How is it used?" Since the wording of the law may differ widely among the textbooks I will show two statements of it. The first statement was in Chad's text book.

First statement of Newton's Second Law:

When an unbalanced force acts upon a body it produces an acceleration that is directly proportional to the force and inversely proportional to the mass of the body. Stated mathematically: $a=F/m$ or $F=ma$ Where "F" is in newtons, "m" is in kilograms and "a" is in meters per second per second.

Second statement:
When a net force acts upon an object it produces an acceleration that is directly proportional to the force and inversely proportional to the mass of the object. $F=ma$ "F" is in newtons. "m" is in kilograms and "a" is in meters per second per second.

To understand the law you need to know, a) What is an unbalanced force as stated in the law? (or what a net force is?), b) Does a body always accelerate with an unbalanced or net force acting on it? Acceleration is defined as the rate of change in the velocity of a body..

The answer to the question of the unbalanced force is found in Newton's first law, which states, "A body at rest will remain at rest and a body in motion will remain in uniform motion in a straight line unless acted upon by an unbalanced force." If Chad understood the first law when he studied it, he would have recognized it as the law that states the conditions for static and dynamic equilibriums. Instead he limited himself to just memorizing vector solutions to problems. The unbalanced or net force of the first law upsets the equilibrium. The second law tells us that the unbalanced force causes a change in the static or uniform motion, from rest or velocity to acceleration. Hence, in the second law, F=ma, the force "F" is an unbalancing force or net force that upsets the equilibrium and results in the acceleration. Also the law reveals the "unit of measurement" for the newton, which is the kilogram meter per second squared. It really helps to know when you are doing problems involving the second law that the force "F" is an unbalanced or net force. It helps you to understand that the net force is a vector addition of all the applicable forces in the data, and the mass is the sum of the masses accelerated by the net force in the direction of the net force. It is good to know what you are doing! This is done by asking yourself the kind of questions that reveal to you the sequential nature of science.

When we had answered our two questions, Chad had increased his understanding of Newton's Second Law and could see the sequential connection between Newton's First and Second Law. Few students I have worked with saw the connection between Newton's first and second laws or the fact that they were calculating an unbalanced force in doing problems involving the second law.

To Chad it was an awakening to learn the reason he missed so much understanding in learning this law. He was more astounded to be reminded that the reason he gave for not needing my class, "because I am already motivated" was the reason he was not learning. Being motivated in college to achieve good grades is not the best motivation for learning. It is not the same as having a functioning curiosity--the Motivation for the need to know and the need to understand something.

There is much in learning science which when understood is remembered; there are some things that require memorization. Things that have names such as the symbolic name for the chemical elements, the names of the six trigonometric functions which are the names for the ratio of the sides of the right triangle, etc. There are rules that explain scientific behavior such as the right hand rules that explain the behavior of electricity and magnetism in wires and coils. It is up to you to know what requires memory and take care of it early.

SOME THOUGHTS ON LEARNING HISTORY

History is the subject that is all about battles and dates. At least this is what we are lead to believe by common parlance. If this is really true a probable cause could be the way the courses are segmented for teaching. If a history class is taught in isolated segments it would tend to promote learning by memory for regurgitation. To learn about the Civil War and its battles from Fort Sumter to Appomattox is not as interesting, and I suggest as important, as the history of the circumstances and reasoning in the country's first eighty four years, that brought the nation to war in 1861.

Actually history can be and is an interesting and exciting subject to learn about if the student is aware of the sequentiality of history. The question to be asked is, "What events brought about, and are the reasons for, the conditions I am learning about?" When you learn this way you will become aware that history files itself under its dates. In order to make history understandable you will find yourself recalling the dates and not the other way around. It is the way you do it with your own history, "Oh yes, I remember that, it happened in September of 1983 after I graduated from Middle School." The event is filed under a date. It is the event you remember and date as a file number. It is when you know your history that you need dates. The dates alone have no meaning.

QUESTIONS CAN HELP ORGANIZE TERM PAPERS

Questions can help you in thinking about a research paper in terms of what you want to say and how you want to organize your paper. Once you have decided on a thesis write down all the questions you want to answer regarding your thesis. Turn your thesis statement and the paper title into questions. This will help you raise other questions. The lack of sufficient material for a term paper is evident when only a few questions can be formulated about your thesis. Too many questions may indicate that your thesis is too broad to make a concise statement or argument and needs to be honed to size.

With a sufficient number of questions you can organize your research paper. Organize your questions into their order of importance. Your research becomes a seeking and searching activity. First you can clarify the goals and objectives of your thesis, then reorder your questions into the sequence in which you want them answered. This can provide the information for making a working outline. Your research will provide the material for expanding the outline into the research paper.

When I have suggested this approach to students writing research or technical papers they have been able to get a "handle on the job" of writing such a paper. You will in time adapt and adjust these to suit your own style.

QUESTIONS GIVE PURPOSE TO CLASSROOMS LECTURES AND NOTES

Students should prepare for lectures by doing the assigned reading before any topic is taken up in class. If this reading is done with self-questions, then you would have answered and unanswered questions to take to the classroom. Having these questions with you in class will improve your listening and give it direction. You will have a much better idea about what you should be doing in class if you come to class primed with your own questions. When you do this you will find yourself formulating new questions from the lecture that will need your answers. This process contributes to your mastery of the subject. It also makes you a class contributor when you know you have significant questions to ask.

Your questions and answers become significant to taking notes in class. You will readily see the important things for notes taking. They relate to or are the answer to your questions.

This kind of approach to the class room lecture promotes spontaneous concentration. Lures which distract thinking and shatter concentration will disappear from awareness. You become absorbed in the classroom learning process. It is self-empowerment in the classroom.

QUESTIONS GIVE MEANING TO LABORATORY EXPERIMENTS AND REPORTS

In the laboratory courses I have taught to freshman students the class was divided into groups of four and five students for performing laboratory experiments. Each group worked on its own experiments. There were always one or two students doing the experiments. While some took an active part by making some contributions, others were passively aware or unaware of what was happening. The result was that too many students did not know how the experiment were performed nor could they do it themselves. Few understood how to write up their experiments. A format was given them to follow for an objective or purpose, the equipment used, data tabulation, calculations, results and a conclusion. Most students could follow the format through to the calculation and results but they didn't have the foggiest notion about writing the conclusion. In my early years of teaching the laboratory manual provided questions for the students to answer in lieu of their own conclusion. This left me wondering, in later years, what the laboratory experiments added to their learning. What can be done?

It is now evident to me that the students did not have a functioning curiosity. Capable students, who want to empower themselves in performing and writing laboratory experiments in science and engineering courses, should start formulating questions for self-confrontation to discover what their job is in fulfilling the purpose, and objective of the experiment. The questions might be as follows:

> What is the purpose and objectives of the experiment?
> Do I understand the purpose and objective?
> What kinds of data do I have?
> What data needs to be determined?
> What instruments and measuring devices are needed?
> How should I arrange my data record sheet?
> How should I arrange my data for ease of calculations?

What kinds of results should I expect and what per cent accuracy and precision can I expect?

What control do I have in taking the measurements?

What conclusion can I write about that addresses the last two questions and the first question.

Your list of questions should be tailored to the experiments you're doing. Their purpose is to get you involved and thinking. Any definitions of terms should be known and understood before any laboratory work begins.

When you write up any laboratory experiments, remember order and write your report so it makes a good communication. If it does not communicate it has no value. This is of extreme importance. If you cannot communicate what you have done or what you know, it has no value. In time, knowledge or information not communicated can be harmful to you.

TESTS AND EXAMINATIONS

Dealing with uncertainty while preparing for, and taking tests and examinations causes too many students too much anxiety, worry and failure. There is much uncertainty in taking tests and examinations if you rely on memory alone when understanding is needed. These feelings of uncertainty can be considerably reduced and in most cases eliminated for students with a functioning curiosity. There is not much uncertainty if you understand and know how to use what you have learned. In other words there is not much uncertainty when you self-validate your learning, which also validates you as a learner when you know that you know.

Uncertainty in taking tests makes it difficult for you to recall problems and solutions within the time restriction. Problems are easily solved during tests when a) you have learned by understanding the reasoning process for solving them, b) you have trouble shot all variations in each set of problems and c) you have practiced, practiced and practiced until you have automated the mechanics of the solutions and they become mundane and you know you can recall the method. Yes, you can be prepared to do problems on tests and exams with ease when you have self-validated your learning.

When you are taking essay type examinations or word problem tests, make your work an ordered presentation to make good a communication. Write legibly organize your essay answers to clarify what you want to say. Order each word problem solution into a logical step by step development that is easy for anyone to follow and understand.

If you have learned with a functioning curiosity you will have the experience of remembering what you have learned. When final exam time comes and you start to prepare for them you may be saying, "I remembered that stuff from way back."

SUMMARY

This chapter is introduced by a number of ideas that I believe needed reiteration. First, in order to have good motivation you must confront yourself with the "BIG QUESTIONS" that block your learning and use self-confrontation to remove their potential to make you vulnerable. It is important that you find answers to the BIG

QUESTIONS because they start you on your way to more goal centered learning.

I also talked about the kind of thinking a student with a functioning curiosity would use, and not use, in learning. The enjoyment of learning is increased when you have a functioning curiosity and your own inquiry is central to your learning. I again emphasized the importance of using your own questions (self-questioning) to develop your motivation. It delineates the learning task you want and need to do. It also facilitates understanding the full scope of your courses so that you see and understand them as a whole. Also, any sequential nature in courses and between courses is revealed to you.

The major part of this chapter includes examples of how you might apply a functioning curiosity to gain academic learning. I say, "how you might apply a functioning curiosity," because, in time, you will develop a functioning curiosity unique only to yourself.

Due to the specificity of the definitions and laws in English grammar and all the sciences it is important to use the three levels of self-questioning as a learning method to master these subjects with understanding. When self-questions are not used, understanding becomes limited and the need for memorization increases. The examples given illustrate this.

As I said in the beginning of this chapter, to get any value from this book you must try it, practice it and use it. To judge the book otherwise is to make a premature closure.

I must stop talking now, for you have much to do. Good learning.

ABOUT THE AUTHOR :

W. H. Thompson born in 1918 is a teacher and counselor now retired. He received a Master in Education in Counseling and Guidance in 1965 and a Bachelor of Science in Mechanical Engineering in 1941, both from Northeastern University.

He spent ten years in engineering and thirty four years in education as teacher and counselor. Five years were spent in two vocational High Schools as teacher and three as a counselor.

Twenty seven years were spent in two-year technical colleges. Eleven years on the faculty of Wentworth Institute in Boston as instructor of electrical circuits and machines and mathematics. Sixteen and a half years were on the faculty of Vermont Technical College in Randolph Center, Vermont where, in 1967, he was the founding professor and department chairperson of the Pre-engineering Technology Department, a pre-freshmen preparatory program for the college at the college. Eight years later he founded and chaired their Learning Assistance Center.

During three years at Wentworth he successfully administered their resident hall. For four summers he successfully worked with emotionally disturbed boys 13 to 18 years of age at the summer camps of Morgan Memorial Goodwill Industries of Boston at South Athol, Massachusetts. A great place to learn the art of discipline.